GAS JOURNAL

LIGHT • HEAT • POWER • BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

VOL. CXLIX. No. 2962.] LONDON, FEBRUARY 17, 1920. [72ND YEAR. PRICE 8d.

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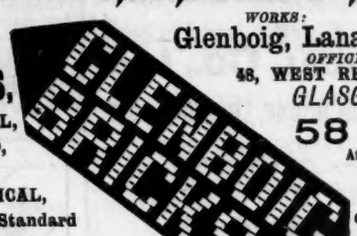

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VOL. CXLIX., No. 2962.] TUESDAY, FEBRUARY 17, 1920. [72ND YEAR.

EDITORIAL NOTES.

Plans of the South Metropolitan Company.

THE South Metropolitan Gas Company's meeting last Wednesday had unusual interest. This is found by reading together the Chairman's (Dr. Charles Carpenter's) opening address and his subsequent exposition of the Bill which the Board have deposited for the acceptance of Parliament in the coming session. The Company's high standard of living in regard to gas quality has done nothing to save it from the crop of unpleasant effects due to the causes from which all other gas undertakings have been suffering; and consequently the Board have been driven to a reconsideration of policy and conditions. The result, as depicted in the Bill, is not one to which any legitimate exception can be taken, other than that the gas industry would have been better pleased if the Company had seen its way clear to join in the common appeal to Parliament. There can be the frankest acknowledgment that, in the material composing the Bill (apart from the fact of the existence of the Bill), the Board have not included anything which can rightly be described as detrimental to the general interests of the industry, nor really antagonistic to its desires. At the meeting there was not a single criticism of the proposals; nor have we seen or heard any substantial criticism from outside.

On looking back over last Wednesday's speeches of Dr. Carpenter on the general affairs of the Company and later on the Bill, there are four things which have prominence. The first is that, whatever happens, it is the settled intention of the Directors to continue to work for a high degree of purity in the gas. There is to be no abandonment of past policy in this regard. The second is that the Board and the Company's men have decided upon pursuing an even more democratic policy than hitherto (good as the past has been) by extending the suffrage power of the workers and their representation on the Board. The third is that the Directors propose a novel scheme for the division of profits. And the fourth—this is particularly interesting—is that the Board have not determined their future policy as to the processes they will adopt, nor as to the calorific quality of the gas they intend to supply. In this respect they are on the bridge; and, until thorough investigation has been made in all directions, they intend to keep before them an open field. The prudence of this cannot be gainsaid by anyone.

Plainly, between the different parts of this scheme interconnection exists. There is in its financial part an effort to enlist a greater interest from all concerned—consumers, proprietors, and workers. In the part that seeks to effect the closer association of the workers with the direction of the Company, there is the recognition that, while capital is the first necessary to the life of an industrial concern, capital cannot do without labour, just as labour cannot do without capital. That their interests have an equality is being appreciated more now than ever before. This equality is recognized both in the financial scheme and in the proposals as to additional power in the election of employee representatives on the Board, which additional power is to be given statutory existence. This paves the way for free consideration of the future policy in regard to gas-manufacturing processes and the calorific quality of the gas. Once provide the means for producing and maintaining the co-operative spirit between employers and workers, and there will be easier sailing than there has been in the past. The men are not unintelligent. It was obviously one of the most gratifying things of which he had to speak at Wednesday's meeting when Dr. Carpenter announced that the decision of the Board—that the policy of the past in respect of labour-saving appliances and processes would have to be reconsidered and revised in view of the high and still soaring costs entailed by production—had been endorsed by the workers. The pre-war policy of the Company (it was always a strong point with Sir George Livesey) was never to replace the manual workers by labour-saving appliances when the work could be done as well and as cheaply by the former. A clear saving and a higher efficiency had to be proved before change was made. But now conditions have altered. They have in five years altered permanently. The Directors submit and the workers agree that the higher expenses of production must be attacked, and cost-saving must be the future policy. This is, with a reform of financial terms, the first necessity in the endeavours to ensure the future of the industry. If there is not greater economy and efficiency, the industry must go back and perhaps under. The lowest possible cost of production is to the advantage of all concerned—proprietors and workers, because for both it increases stability, and is one of the main avenues to enlarged business, and therefore employment. This is a simple consideration, but, though simple, it is big with truth; and the South Metropolitan workers realize it. Hence the desire to co-operate; for in co-operation is the path to permanent gain for all.

This position means that the Chairman and Directors of the Company are keeping an open mind as to the future. Dr. Carpenter spoke not only of appliances, but of processes. We cannot tell—perhaps he cannot himself yet—what this portends, but it is full of possibility. It may mean a radical alteration in policy. "We are not in a position," remarks Dr. Carpenter—"and shall not be for a long time—"to say what is the most economical and best calorific value "to supply." And, again: "The object of the new pro-"posals is that we may supply heat units as economically "as possible; but whether they shall be in the form of gas "of 600 B.Th.U., or 500 B.Th.U., or any other figure, we "cannot say." This is a positive statement that there is no determinate resolution in the minds of the Board as to the future composition and calorific quality of the gas, though concentrated thermal value per cubic foot was an advocated principle of not very distant days. The principle is not renounced; but the speeches last Wednesday leave the door open for any revision that may be desirable. Of course, there will have to be a declaration within six months of the passing of the Act (if passed in its present form) as to the calorific power that will be supplied at the outset of the new conditions; but power is retained to vary, under the terms of the recommendations of the Board of Fuel Research, the calorific value to whatever standard may be subsequently decided to be the best for realizing further economy and efficiency. The Company do not look upon the obligation to adjust consumers' appliances with change of calorific power as at all an irksome one. On the contrary, they see permanent benefit in the obligation.

The proposal to abandon the sliding-scale, and to set up a new system of dealing with profits, has been referred to by us on previous occasions. The basic price proposed, it will be remembered, is 11d. per unit of 100,000 B.Th.U.; and the dividend at that figure is 6 p.ct. The sum by which the price of gas is reduced below the 11d., multiplied by the sales of gas, will be the consumers' share, and will represent three-quarters of a sum the remaining quarter of which will be divided equally between the proprietors and the co-partners. Thus, in the results of economical and efficient working, proprietors and co-partners will share and share alike. Nothing could be fairer. There is the best incentive

in this, under strict regulation, to profit making, with the greater part being assured to the consumers. The sliding-scale as it now stands only considers stock or share holders and consumers; but this scheme (if the Bill passes) incorporates the co-partners, so that they will have their share as a statutory right. All interests are therefore considered; and to this there can be no objection. In short, the underlying principles of the scheme are a fair return on capital, a fair price to the consumer, and a fair share for the workers; and if anywhere the wisdom of such principles is not seen, one of the chief lessons of the war period has failed to impress itself.

Only one other point. The limitation of inerts proposed by the Board of Fuel Research raises no fears for the Directors and officials of the Company. The Directors are adopting the recommendations of the Board, and not suggesting any lower standard; and they will be able to keep within them, as they have proved, quite easily. As to purity, work has now been resumed on the erection of the plant for carrying out the catalytic system of removing carbon bisulphide from the gas; and in the Bill, it is provided that, if a certified specified degree of purity is attained, an extra allowance shall be made to proprietors and employees of a sum equal to ¼d. per gas unit. The reason for this proposal is that the Directors look upon the money spent in realizing this higher purity as being better for the consumers than an equivalent reduction in the price of gas. This being so, the attainment of the higher degree of purity would, to the measure of its cost, deprive the proprietors and workers of the reduction of price which would bring to them a share of increased profit. Hence the justification for the innovation.

The details associated with these matters are many; and those who are interested in them—and who are not in the industry to-day?—will find them spread out in orderly and explicit fashion in the speeches that Dr. Carpenter delivered on Wednesday.

Gas Capital Powers—Financial Relief Later.

A USEFUL measure was introduced into the House of Commons by the President of the Board of Trade last Wednesday. It is to be known as the Public Utility Companies (Capital Issues) Bill. Hitherto, to meet the stress of the times in regard to the raising of capital—largely through the restrictions upon dividends on existing capital, and the regulations that attach to the statutory powers already possessed in regard to the raising of capital and the borrowing of money—all gas companies have had to make individual application to Parliament to confer on them greater latitude in respect of the issue of preference and debenture stocks, to enlarge the dividend or the interest paid upon them, and to increase the ratio of borrowing powers to capital issued and paid-up. The new Bill is intended to do away with the need for special application to Parliament, and, as soon as the measure is passed, to substitute the consent of the Board of Trade. The Act will only remain in force for two years, unless Parliament decrees otherwise; but the expiration of the Act will not affect the validity of anything done under it. Thus it is only intended to be a temporary measure to facilitate in these times the raising by gas and water companies of money for capital purposes. The Act proposes to empower the issue of already authorized capital or money that may be borrowed at a reserve lower than the nominal amount of the stock; to allow authorized ordinary stock to be issued as redeemable or irredeemable preference stock; to permit irredeemable preference or debenture stock to be issued as redeemable preference or debenture stock; to extend limited debenture stock or borrowing powers to an amount not exceeding half the issued and paid-up share capital; and to authorize the payment of a higher rate of dividend or interest on new preference stock or debenture stock or borrowed money than that authorized by a Special Act. The conditions that it is contemplated shall apply to these proposed powers are printed with the text of the Bill in later columns. The new measure will probably be up for second reading during this week.

While the Bill will be very useful as a temporary expedient, what the gas industry is looking for very anxiously is information as to what the Board of Trade will be proposing in the way of relief to existing capital, and to enable gas companies to re-establish the respect of investors. It shows how hard-hit the industry has been when debentures offered at good rate of interest go begging for purchasers; and we cannot help feeling that the value of the temporary capital powers proposed by the new Bill will not be realized in full measure till existing capital receives a due reward. That it is not doing so only serves to warn-off new investors. This, however, by the way. People are talking more and more of financial revision, and of what should be done; and proprietors are getting anxious. One of the questions is as to what is likely to be the future standard or minimum rate of dividend. Some of the best financial authorities in the City are fully persuaded that nothing less than 6 p.ct. dividend for the existing ordinary stock will reinstate the confidence of investors; and if this is not forthcoming, then the industry stands a good chance of being starved, and its development hindered, through the absence of new money. The 6 p.ct. is what is proposed in the South Metropolitan and South Suburban Bills. The Chairman of the Commercial Gas Company (Mr. W. G. Bradshaw) has a recognized position in the City in relation to financial matters; and it will be seen from his speech at the meeting of the proprietors last Thursday, that he is persuaded that much of the mischief that has been done is due to the short-sighted and narrow-minded policy of the public authorities who have opposed a fair measure of relief in the fallacious supposition that they were protecting the public interests. That is quite true; and if the members of those public bodies would only apply to their own businesses the conditions of the gas industry, and to their own capital the meagre dividend which they were largely instrumental in obtaining, they might see things in a new light. In what was done, there was no measure of protection of the interests of the public. Any temporary advantage to the public will have produced a permanent disadvantage. As Mr. Bradshaw puts it, "the temporary advantage to the consumers of gas is not large; and it is purchased at a "high cost in the future."

However, the heavy losses in dividend and market value of gas stocks through the short-sighted policy, and the ill that has been done to the gas consumers in consequence, can only be gradually set right by Parliament taking, and that quickly, a liberal view of the position in providing the remedy. Solely in this way can some amends be made for the injustice from which the industry has been suffering. But amends will not be realized merely upon request. Unfortunately, people do not understand the position, or rather those do not who are not intimately interested. But there ought to be no difficulty in making intelligent men, especially those of business training, see the folly of submitting a large industry to the blighting influence of an insufficient reward for capital and enterprise. Mr. Bradshaw considers that the principle of the sliding-scale is as worthy of admiration as ever. There is no question as to that. But when one considers the original object of the sliding-scale—the provision of an incentive for good management and high efficiency—the necessity has changed, owing to the incentives provided by keen competition and the increased costs of conducting business. The administrators of gas undertakings who do not in these times show business acumen in the conduct of their undertakings will and must fail in the work for which they have been appointed, and will do so in the future despite any inducements created and held out to them by the sliding-scale. The principle of the sliding-scale is good, providing that, in any circumstances, a dividend is yielded by its operation that will maintain the credit and stability of a concern. No one has any desire to see, through want of prevision, a repetition of the disaster to the industry such as we are now experiencing. An excellent point was made by Mr. Bradshaw when he objected to the price charged for gas on Jan. 1 this year being made the standard. This would mean that inefficiently managed concerns would secure a high standard, and those efficiently managed a low one. Nevertheless, he believes that the adjustment of one of the factors in the sliding-scale would produce the readjustment or revision desired; while a specially created tribunal could consider the special circumstances relating to any particular undertakings.

Towards the close of the proceedings at the Commercial Gas Company's meeting, the Secretary (Mr. F. J. Bradfield) mentioned that the National Gas Council are moving in the matter of the preparation of propaganda in connection with this question of financial relief; and literature will be circulated at the proper time among gas stock and share holders. There is heavy spade work to be done; and gas stock and share holders must be aroused to an appreci-

ation of the fact that they should act as disseminators of information, and bring personal influence to bear upon members of Parliament, in order to achieve the necessary financial revision, for there is certain to be opposition. The Bill is not likely (so the Central Executive Board of the National Gas Council say) to be introduced before Easter; and between now and then every opportunity must be taken to let the public know the facts of the position, and particularly Members of Parliament. Talking at meetings of gas proprietors is not enough. Talking outside them is what is required. But before gas proprietors can talk, they themselves must be instructed. They well know how dividends and stock and share values stand; but there are other things about which they must be informed before they can talk intelligently regarding this matter. They must have good acquaintance with both causes and effects.

Preparing for the New Conditions.

WRITING on Feb. 3, emphasis was laid on the need for the highest attainable efficiency at the gas sales end, in view of the new conditions of gas supply. The need has always existed; but it does so more than ever to-day. Some may say that the new conditions, statutorily defined, are not here yet. With this submission we can agree with qualification. The old conditions are past; the war period set-up new conditions; and we are moving from them (without returning to the former conditions) to those which it is hoped and expected will be prescribed by Parliament in this new session. Now is the time for preparation, and for showing Parliament and the communities served that the industry is alive to its new responsibilities, and is making headway in meeting them. How shall the work of preparation be taken in hand? Many progressive undertakings have schemes of their own; other concerns have not shown any particular interest in the matter. The parable of the foolish virgins has been of pertinent application in mundane affairs through the ages, and will continue so. Those responsible for gas undertakings who desire to know the best and wisest plans to adopt cannot do better than consult the paper that Mr. R. J. Rogers gave to the Midland Junior Association, from his large experience at Birmingham, as published in our issue last week. If Birmingham cannot be emulated in all respects by the smaller concerns, hints may be gathered from the paper which will direct as to lines that should be taken. Those undertakings that have schemes of their own for raising the efficiency at the gas sales and fitting business end in order to meet the new conditions, will do well to study the paper to see if there is anything in it which will help to improve their own ideas of what is necessary. This question is one of vital importance. Men and methods have to be made more efficient, to keep abreast of these fast-moving times; for no gas undertaking can expect to obtain the maximum results in output unless the sales are controlled by men who possess technical and commercial ability, and unless their methods and appliances are such as will best meet the wishes and needs of the public.

An important feature of the work to be done, having men and methods right, is to look upon every new house that is built in the gas-supply area as an opportunity for the gas undertaking; and to see that piping suitable in size and position is put in, so that there may be developments of use, and thus of business. At the same time, there are the existing houses. With developments of gas use, many of them are rich in defects in the matter of insufficient piping through increased connections; and from this fact have arisen many of the complaints that were made during the war years and the period of coal shortage, which unfortunately is still with us in a highly acute form. From past experience and deficient conditions, the industry must profit in present work that will have to carry future developments, and produce continuous satisfaction. With expanding use as a fuel, the gas of the future will require pipes of larger diameter. The old standards have, by the evolution of conditions, been driven among effete things. Mr. Rogers regrets that there are no general statutory powers in the hands of gas undertakings to prescribe the sizes of pipes inside houses. Electricity and water authorities can frame bye-laws for installations in buildings; but it is just as important that like powers should be conferred upon gas undertakings—more now than ever. The National Gas Council might look into this matter; and there might be a suggestion as to a clause being inserted in the coming Bill dealing with the question of a heat-unit basis. The matter of minimum pressure is going to be dealt with; a concomitant is the adequacy and general fitness of the consumers' piping, which should as and where necessary undergo gradual improvement. It would all subscribe to efficiency in gas consumption; and efficiency in this respect means the development of the use of gaseous fuel, the gradual abolition of smoke, and the putting of our coal supplies to the best use in the national interests. But in the absence of statutory powers, is there not something that could be done by gas authorities? There is nothing whatever to prevent their giving advice and preparing for architects and builders general plans of suitable piping.

This reference to Mr. Rogers's paper does not exhaust its contents. It touches on many subjects of current importance; but its chief moral is that gas undertakings must prepare now for what is before them, and shape work on the district with an eye to maximum advantage under the new conditions.

Gas Boosting—Naphthalene Experience.

THE enforced neglect of gas-distributing systems among other plant during the war, the proposal of the Board of Fuel Research that the minimum gas pressure shall be 2 in. in all mains and services down to 2 in. diameter, and the stretching-out of the arms of distributing systems to incorporate outlying areas, will combine to bring into increased prominence the question of gas-boosting. Much has been published from time to time on the subject; but in this issue there appears quite a concentrated and interesting account of what has been done in this connection at Stafford. Safe it is to say from the information given by Mr. T. H. Poulson (Assistant to Mr. W. M. Valon) that Stafford would not on any consideration be without its gas-boosting plant.

The question as to the relative advantages of enlarging low-pressure trunk mains, or duplicating them, or installing compressing plant, is still one over which (in discussion) engineers disagree. But when it comes to the stage of making decision, boosting has so much to commend it—from capital outlay to the flexibility it gives in meeting peak loads and arbitrary demands, and the requirements of distant places at reasonably low cost—that it generally wins. The three methods already mentioned of improving gas distribution systems were carefully considered at Stafford; and, in the order in which we have referred to them, the capital costs were estimated respectively at £11,000, £8000, and £4000. Calculating interest at 5½ p.ct., and depreciation at 8 p.ct., there is at the outset a considerable difference in favour of boosting, which difference allows for the working of the boosting plant, and leaves quite a respectable balance to the good—under the conditions existing at Stafford, which, of course, cannot be taken as being typical of all circumstances and requirements. However, the wide range of power which the boosting plant confers is something which has also a monetary value. At Stafford, about 60 million c.ft. a year is being dealt with by the compressing plant; and, including the cost of gas (charged at 3s. per 1000 c.ft.), oil, maintenance, interest, and depreciation, the cost of the boosting scheme and operation works out to 3·62d. per 1000 c.ft., as compared with 4·39d. for the £8000 low-pressure trunk main scheme—the 4·39d. covering maintenance, interest, and depreciation. The two rotary compressors are of the Donkin type, with three steel feeder mains—two of 7 in., and one of 4 in.—delivering through Reynolds high-pressure governors.

There are several practical points brought out in the paper. One of the 4-in. mains is of cast iron, and is a conversion from low to high pressure service; and it is interesting to note that, though it has been in use for 33 years, not more than a dozen joints required to be repaired. A point raised towards the end of the paper is as to the effects of compression upon naphthalene. Before the introduction of the plant, naphthalene stoppages were serious. But Mr. Poulson says that during the past five months not a single service stoppage has been found to be due to naphthalene. He attributes this partly to the vertical retorts. We should think it is largely due to them. But Mr. Poulson ventures upon another reason. It is that "a portion of the oil intended for lubricating the compressors is carried over with the compressed gas, and acts as a carrier," or solvent. This is an advantage; and if it is the explanation, the unpremeditated action pays. But it is rather hard on the gas-compressors to be robbed of their lubricant, which makes them look more extravagant in their requirements than is actually the case.

Nationalization.

By a majority of 265, the House of Commons last week rejected Mr. Brace's amendment to the Address, in favour of the nationalization of the coal mines; and thus gave a clear indication as to the views of Parliament on the subject. The Labour Party, or a section of it rather, is not pleased; and there are members of the Miners' Federation who are highly wrathful. One of the striking features of the debate was the beautiful egotism displayed by certain labour leaders. The Labour Party, it was said, are not proposing the nationalization of the mines because they hope to gain some advantage, but because they are persuaded it would be in the interest of the nation. But what does the nation itself think? The House as representative of the nation gave a very conclusive answer. No democracy could or would consent to a minority over-riding the views of the majority; and it is because of this that the Premier knew he was safe in speaking out as he did, and leaving the Miners' Federation under no misapprehension as to the likelihood of a fulfilment of their desires in the existing circumstances. These desires are not actually the ones expressed. Nationalization as proposed in this case is something that is counterfeit; and behind it is ultimate control by the Miners' Federation. The Premier outlined the alternative Government scheme. A Bill is to be introduced to create a Department to have certain control over the mining industry; and the scheme will incorporate means by which the miners will be able from their store of experience to contribute advice. There will also be acquisition of coal royalties by the State; and in connection with this a fund will be created for the improvement of the conditions of life of the miners. Already the hot-headed ones have been talking of a general strike. What for? Because certain leaders in the Miners' Federation want to order the policy of the nation; and if they cannot have their way by constitutional means, they will try to get it by the opposite course. But it is hoped the counsel will prevail of the more sober-minded leaders who prefer the former method, and who realize that the violation of right in this matter will ultimately have disastrous results for trade unionism.

Coal Profits.

There is great disparity between the amount of the currently accumulating profits of the coal industry as estimated by the Miners' Federation, and as calculated by the independent firm of Chartered Accountants (Messrs. A. Tongue and Co.) called in by the Government to investigate the matter. It will be recollected that the Miners' Federation asked that the price of industrial coal should be substantially reduced so as to diminish the cost of production, and through it the cost of living. They believe that there will be a large reservoir of profit as things are going—something like 54 millions sterling—from which their amiable intentions could be satisfied. But the Chartered Accountants can only find that there will be some 6 millions of profit. The Miners' Federation, however, are likely to stick to their estimate; and it will probably be on the ground that the periods taken in the estimates are not coterminous. The Federation estimates were based upon twelve months from July, 1919, which will be the first complete year's operation under the shorter working day of seven hours, and the Sankey award of 2s. 8d. additional per day. The Accountants, however, have drawn up their estimates from March to March; and so they have included three months when the industry was under unsettled conditions through the return of demobilized men. As against this contention, an eight-hour day was being worked between March and July last, and the extra wages were not being paid. These facts would, if anything, contribute to a higher profit. There threatens to be a battle-royal over this matter. The new Government Bill—a temporary measure—for dealing with the profits to be shared by the coal owners, was issued last week; and so it may be expected that there will be an early resumption of controversy over this particular aspect of the difficulties of the coal world.

Cost of the Ten Shilling Reduction.

From the report of Messrs. Tongue and Co., it is also learned that the Coal Department estimated that the reduction of 10s. per ton of coal for household and domestic use (including the proportion of coal used by gas and electrical undertakings applicable to domestic consumption) would probably apply to 23,000,000 tons of coal for the four months from Dec. 1, 1919, to March 31, 1920. The proportion of coal used for these purposes is much greater than the exact time proportion, owing to the period covered being the worst part of the winter. There has been a tendency to increase consumption this winter; but from the data available, the accountants think the estimate reasonable. The cost of this reduction in household and domestic coal (including compensation to coal merchants in respect of stock), together with the estimated cost of the reduction in coastwise bunkers, is calculated at £12,600,000, which is also regarded as being approximately correct.

Coal Shortage in Gas-Works.

Many gas undertakings are going from bad to worse in the matter of coal supplies. There are some that have only a few hours stock in hand. Where is the coal going to? The weekly output, since the miners got over the Christmas Holidays, has been at good figures compared with the war time records, which, of course, are not the 1913 ones. There would not have been all this trouble if proper deliveries had been made during the summer time. From minutes published in other columns, it will be seen that the Central Executive Board of the National Gas Council are using every channel of influence to bring about the reign of better order in the coal conditions of the industry.

Piped Gas and Wired Current from any Quarter.

The Great Northern Railway Company have stirred-up lively opposition by their proposal to buy gas and electricity where they like on their system, and pipe or wire them to any part for their own use. It may be good economy for them; but it is not quite "playing the game" with the less affluent gas and electricity supply undertakings along their lines, who are considerable customers of the railways, and who naturally want the custom of the railways. The clause of the Great Northern Railway Bill in which the wide power is sought means (if it is allowed by Parliament) the taking away of part of the rights of statutory undertakings through whose districts the railway passes. The opponents are assembling in heavy mass. The Gas Companies' Protection Association and the Gas Light and Coke Company are among them. And glancing along the lines of those preparing for a fight are seen corporations, district councils, and gas and electricity companies.

Benzol Prices.

There is very good reason for the price of benzol going up, just as there is for other commodities coming from the carbonization of coal. Benzol users have no more right to expect not to bear some share of the increased costs of coal and wages and transport than have gas or coke consumers. Nevertheless, there are benzol users who are kicking up a fuss over the recent increase of 4d. per gallon. There are, it is also observed, motorists who see in certain movements an attempt on the part of the oil interests to get control of benzol. In proof, they point to the Anglo-American Oil Company having acquired a benzol rectification plant in the Manchester district, and state that the Company are bidding 6d. per gallon more for crude benzol than the National Benzol Association. "Motor" urges motorists to patronize benzol as much as possible, and not to press for the removal of the 6d. tax on petrol, as this would "leave the benzol producers at the mercy of the monopolists; and motor transport would be severely hampered."

Federation of Non-Manual Workers.

The first step was taken at a Conference last Saturday week (held at the Essex Hall, Strand) to bring about a fusion of organizations representing professional, technical, administrative, and supervisory workers. The proposal has for its object to strengthen the hands of organizations engaged in looking after the material interests of their members. But it is declared that there is no intention to affiliate with the Labour Party or the Trade Union Congress. That this was part of the programme has been hinted in more than one quarter; but denial is strong. The scheme, the report states, originated with the Labour Research Department. At the conference, between thirty and forty organizations were represented. It is remarkable where they all sprang from. The

resolutions expressed the opinion that a Federation should be established on the basis proposed in the draft constitution as submitted. The matter is now to be referred to the various organizations. This will be succeeded by a further conference, after which the Federation will be inaugurated. A Provisional Council was appointed; it was agreed that the title of the Federation should be "National Federation of Professional, Technical, Administrative, and Supervisory Workers"; and it was decided that the entrance fee of each Society should be £30. The title is a cumbrous one; and the objects of the Federation, so far as the announcements in the Press go, are somewhat vague. The question arises as to what the Federation can do that the societies cannot do in their individual capacity. We do not anticipate that through the Federation the "black-coated" workers will propose to take "direct action," and call a general strike, when they cannot get everything they desire. Perhaps the Federation would have the power which numbers give in matters of a political nature; but beyond that the ambit of its work appears to be somewhat ill-defined.

PERSONAL.

Mr. T. F. C. RHEAD, M.Sc., has been appointed Chief Chemist by the Birmingham Corporation Gas Department, in succession to Dr. E. W. Smith, whose resignation (to join Sir Arthur Duckham in the formation of a new private company to deal with matters relating to fuel conservation) has been already recorded in the "JOURNAL." Mr. Rhead has for some time acted as Chief Assistant to Dr. Smith.

After having been eighteen years in the service of the Company, Mr. G. R. CASTERTON has resigned the position of Engineer and Manager of the Melton Mowbray Gas-Works.

Sir JOHN F. C. SNELL, who has been appointed by the Minister of Transport as Chairman of the Electricity Commissioners, is a Past President of the Institution of Electrical Engineers and a member of the Council of the Institution of Civil Engineers.

By a decree dated Jan. 15, M. H. O. LAURAIN, the Consulting Engineer of the Paris Gas Company, has been promoted to the grade of Officer in the Order of the Legion of Honour; and M. R. C. L. MASSE, the Chief of the Société d'Eclairage, Chauffage, et Force Motrice, received a similar honour, under date of Jan. 16. Both are prominent members of the Société Technique du Gaz en France. M. Laurain, who is President this year, took a leading part at the "Allied Reunion" in the autumn.

At a meeting of the Institution of Civil Engineers last Tuesday, Mr. DOUGLAS FORBES IRVING, of Bristol, was elected an associate member.

Mr. H. B. ATTWOOLL, who has been engaged at the Grimesthorpe works of the Sheffield Gas Company as Assistant Chemist, has been appointed Chemist at the Rochester Gas-Works. On taking leave of his late colleagues, he was presented with a timepiece, subscribed for by the staff and foremen at the works.

Mr. CHARLES POTTS, the Secretary and Manager of the Hyde Gas Company, has resigned his position; and his resignation has been accepted with regret by the Directors. His long experience and intimate knowledge of the undertaking will still be at the service of the Company, with whom Mr. Potts had been for 53 years last July. He began as a clerk in the office at the age of eighteen years; and at that time the concern was rather a small affair, for there was only one other member of the clerical staff. Later he became Cashier and Chief Clerk, and 22 years ago was appointed Secretary and Manager. He has held the dual position with credit to himself and satisfaction to the Directors. Under his management, the business has been greatly extended and enlarged; and some twelve years ago a new gasholder was erected to supply the increasing needs of the large number of consumers. When Mr. Potts commenced as Manager, there was a total of 4800 consumers; to-day there are over 10,000. Indeed, the number of slot-meters alone exceeds the total of consumers when he took up the position. A great increase of business followed the introduction of prepayment meters and the hire system of gas-cookers, grillers, and boiling-rings. Another development came with the change from the flat-flame burner to the incandescent mantle. When he had been with the Company fifty years, Mr. Potts was presented with a rosewood timepiece and a smokers' cabinet, subscribed for by the Directors and the employees. The dual position has now been split-up; and Mr. FRED OLDHAM, Cashier and Chief Clerk, who has been in the service of the Company for 23 years, has been appointed Secretary. Mr. DAVID H. DAVIES, Gas Manager at Herne Bay, has been appointed Engineer and Manager, and will commence his new duties towards the end of March. There were 37 applicants. Mr. Davies was educated at Whitchurch Grammar School, and for a period was assistant to his brother, then the Engineer and Manager of the Llandudno Gas-Works. In 1902, he became Assistant Manager of the Nantwich Gas Company; and in 1903, when the Nantwich Urban Council purchased the undertaking, and the works were taken over, he was appointed Engineer and Manager. Despite the high purchase consideration, he succeeded in reducing the price of gas after meeting all liabilities. In October, 1918, he was appointed Engineer and Manager of the Herne Bay Gas and Electricity Company, Ltd., and did excellent work there; but owing to the state of his wife's health, he was compelled to seek a change.

NATIONAL GAS COUNCIL.

Meeting of the Central Executive Board.

A MEETING of the Central Executive Board of the National Gas Council was held last Tuesday, at No. 30, Grosvenor Gardens, with Alderman F. S. PHILLIPS (Vice-Chairman) in the chair.

COAL SUPPLIES.

The Chairman referred to a deputation from the National Gas Council to the Controller of Coal Mines that took place on Jan. 16 on the subject of coal stocks, and announced that a proposition was to be placed before the Council by the Coal Mines Department for the purpose of stabilizing the demands for domestic coal and gas.

After the reading of a resolution from the Midlands District Executive Board, it was resolved that urgent representations be made through the British Commonwealth Union with a view to bringing before Parliament the imperative need of an immediate improvement being effected in the supplies of coal if many gas undertakings were not to shut-down altogether in the very near future. It was pointed out that some of them had only a few hours' stock of coal in hand.

With reference to seaborne coal, the meeting passed a resolution asking that the Council should continue negotiations with the Coal Mines Department with the object of remedying the lamentable state of affairs that existed in consequence of the order compelling certain undertakings to take seaborne Durham coal for gas-making purposes.

Evidence being produced of the Government's attempts to induce certain undertakings to use Kent slack for gas-making purposes, it was resolved that the Council make strong representations to the Coal Controller as to the unsuitability of such coal for the purpose of carbonization.

With regard to the Coal (Pit's Mouth) Prices Order and Direction, 1919, it was announced that further and final instructions had been issued to members of the Council on the 6th inst., in an endeavour to clear-up as many as possible of the difficulties arising out of the Coal Controller's instructions dated Dec. 24.

MATTERS IN PARLIAMENT.

On the subject of financial hardships, it was reported that the Board of Trade Bill would be presented after Easter.

It was announced that certain companies, including the Gas Light and Coke Company, were petitioning against the Great Northern Railway Bill, by which, under section 47, the Company sought power to take and use gas on any portion of their railway from any gas undertaking, whether the place of such user were within or beyond the limits of supply of the gas undertaking giving the supply. The matter has also been referred to the Gas Companies' Protection Association, who are petitioning against it.

It was resolved to thank the Gas Companies' Protection Association for a letter received by the Council containing an interpretation of section 18 of the Finance Act, 1919, as arrived at by the Inland Revenue authorities in consultation with the Income-Tax Sub-Committee of the Gas Companies' Protection Association.

PRICES OF METERS.

With reference to the recently announced increase in the price of new meters—viz., 15 p.ct. on the standard list-price of all new meters dispatched from the works on and after Feb. 2—it was decided to investigate still further the question of costs.

It was reported that invitations to a Conference of Manufacturers and Producers organized by the Federation of British Industries had been circulated among members of the Board.

SUNDRY QUESTIONS.

A letter was reported from the Council's representative on the Fuel Economy Committee of the Federation of British Industries announcing that an expert upon the use of fuels was to be appointed to that body, of whose services all members of the Federation were invited to avail themselves.

The Manager to the Council reported the negotiations which had taken place with the Coal Mines Department on the subject of coke, as a result of which divisional officers were being advised by the department that the present authorized price of coke would be that ruling prior to Dec. 1, 1919, *plus* the increased freight on coal. Application should be made by gas undertakings to their Local Fuel Overseer for authority to add such increased charges.

At the moment of going to press there is to hand from Mr. Walter T. Layton a copy of a volume dealing with the early years of the South Metropolitan Gas Company (from 1833 to 1871). Notice of what the author has to say will be taken later.

We are informed by Mr. G. W. Allen (Secretary-Treasurer) that the Executive Committee of the Canadian Gas Association have fixed the thirteenth annual convention for Aug. 25 and 26, in Ottawa. A very successful meeting is anticipated in the Capital City of Canada.

ELECTRICITY SUPPLY MEMORANDA.

IN the article that Sir Dugald Clerk contributed to our pages last week, he acted very generously to his misinformed and somewhat hostile critics in the electrical papers. He pointed to typical instances of where they had made mistakes regarding the relative positions of gas and electricity in the matter of coal conservation; and he went to some pains to put them on the highway to a correct appreciation of the figures which he has presented. There has not been a single criticism of these figures that has not gone astray fundamentally. If anything, Sir Dugald has deliberately ensured that his figures may be on the right side with something in hand, not taking the best that can be done by gas. And moreover he has charged all the expenditure of heat up against gas, notwithstanding that there is about ½ ton of coke for sale, besides tar, ammonia, and sulphur. In respect of efficiencies, too, he has adopted for gas a range of figures that take in good, bad, and indifferent appliances, but not the actual best that can be accomplished by the most modern of appliances. Nevertheless, the figures are extremely interesting. In arriving at the average efficiency of gas-heating appliances, Sir Dugald takes the mean values of gas-fires 65 p.ct., boiling and heating water 60 p ct., gas cooking by oven 11 p.ct., and steel heating 31 p.ct.—totalling 168 p.ct., and dividing by the four uses this represents an efficiency of 42 p.ct. This, in order to obtain an average figure, assumes equal quantities of gas used for each purpose. But the boiling and heating of water and other liquids completely swamp the use of gas ovens; and the same with gas-fires. Concerning gas-ovens, there are, of course, millions in use, and all sorts and conditions. Ovens, however, have come, and are coming forward, in which the heat losses have been very considerably minimized. There is the closed-in bottom oven with merely air apertures sufficient to sustain combustion; and there are the externally heated ovens in which the heat of the products of combustion is also brought into service by carrying the products in flues between the inner and outer casings. Electricity is, as will be seen, dealt with in precisely the same way; and exceedingly liberal figures are shown in according to electric heating of rooms 100 p.ct. efficiency, and water boiling 60 p.ct. The other figures will be found in the article. The average efficiency of electricity (assuming equal quantities of heat used for the four purposes) is 59 p.ct. What does this mean? Taking an electric supply station selling 500 units per ton of coal used, there would be delivered to the consumers 1.710,000 B.Th.U.; and 59 p.ct. of this figure would be 1,008,900 B.Th.U. Take for comparison a gas-works selling 13,000 c.ft. of 475 B.Th.U. gas (which falls far short of front practice to-day with steaming), there would be delivered to the consumer 6,175,000 B.Th.U.; and the average efficiency of 42 p.ct. arrived at as explained in the article means 2,593,500 B.Th.U., compared with 1,008,900 B.Th.U. for electricity under the conditions mentioned. With modern gas practice, the position would be far worse for electricity; and there is beyond the gas, the coke, tar, sulphate of ammonia, and sulphur, to say nothing of the valuable derivatives from the tar, and the benzol, cyanides, &c., recovered by many gas undertakings. If our friends like to carry the comparison to works supplying mixed gas obtained by steaming charges or by adding a proportion of blue water gas, and so realizing an additional 2, 3, and more million B.Th.U. per ton of coal handled, the case would be considerably worse for electricity. However, more of these matters if the Institution of Electrical Engineers adopt the suggestion in the final paragraph of Sir Dugald's article in the last number of the "JOURNAL." A friendly, fair, and honourable debate with electrical engineers, open to the Press and full publicity, would be just what the gas industry would be pleased to have; and, of course, after the claims that have been made for electricity, our electrical friends will no doubt leap at the proposal.

Sir Dugald Clerk's Comparisons and Suggestion.

Consumers and the Lean Allowance.

The more the 10s. coal rebate is considered in relation to the allowance to be made on domestic electricity accounts, the more one becomes impressed with the fact that fuel alone has taken a very small part in the 50 to 100 p.ct. increases during the war in the price of electric current; and therefore the chances are very small of any material reduction being made in consumers' charges for some time ahead. We have made this clear on previous occasions when noticing the new, though temporary, condition of an allowance in gas and electricity trading. In an article in the "Electrical Review," Mr. E. W. Dorey sees trouble with the domestic consumer through the tremendous difference between the allowance and the increased cost of current. Take an electricity undertaking, the charges for which have gone up 100 p.ct. for domestic lighting—say, from 5d. to 10d. Assuming a consumer using 100 units, the cost now at 10d. would be £4 3s. 4d., compared with £2 1s. 8d. before the war. If the undertaking uses 3·93 lbs. of coal per unit of electricity sold, the allowance from the 10s., less 5 p.ct., would work out to 0·2d. per unit, or on 100 units to 1s. 8d., which compares with the £2 1s. 8d. increase! The 5d. price has been advanced 100 p.ct.; the allowance works-out to only 4 p.ct. of the increase of 5d. This is merely a hypothetical case. Mr. Dorey works-out figures which show that in an undertaking selling 600 units per ton of coal, so using 3·74 lbs. of coal per unit (which is a result obtainable only in the larger stations), the allowance would amount to 0·19d. per unit; with an undertaking using 3·93 lbs., the allowance of coal would be 0·2d.; and with a smaller station using 6 lbs. per unit sold, the allowance would be 0·305d. Comparing the increases that have been made with the allowances, the consumer will not have much cause for congratulation from himself or anyone else. Mr. Dorey does not think the accounts clerk is to be envied this fresh complication; and after the work of this estimable gentleman, "when it is considered that 10s. per ton is, on the average, one-third of the total cost per ton of coal to-day delivered to the supply undertakings, the reduction of a paltry (say) 3·5 p.ct. only on the bill will need some explaining, even by those skilled in the art." Mr. Dorey does not show how the increase is to be explained; but, of course, there is an explanation.

The Outlook for Reductions of Charge.

The explanation is to be found in the other outgoings—capital, labour, materials, and so on. During the war, only a certain few privileged electricity undertakings—those engaged on munitions work—were allowed to spend money upon extensions; so that it may be said that, generally speaking, the capital charges have not yet appreciably risen. But every £1 of capital now expended will buy less and will cost more; so that it is very obvious that, undertakings having had to put up their charges by such large percentages, and yet only able to allow so small a percentage for a reduction of 10s. per ton (less 5 p.ct.) of fuel, the outlook for substantial reductions of the present charges is not bright. The additional costs of capital, labour, materials, repair, maintenance, and renewals, &c., will be so considerable that any reduction of fuel expenditure will be lost in the mass. The outlook is not particularly good in this regard. Superpower stations are not going to be exempt from the additional costs; and any saving in fuel can only form a deduction from the increased outlay on distribution. It will be wise for as much use as possible to be made of the lower capital expenditure of the past. There does not seem to be much chance of ever wiping-out those war increases of 50 to 100 p.ct.; so that the time will come when the percentages will have to be converted to ordinary charge. The sooner this is done, the quicker will the trouble with consumers be got over. However, this is a little off the track of Mr. Dorey's article, glancing at the end lines of which we read: "In the interests of the electrical industry, it is very desirable that the reasons for these very heavy 'war' increases of 50, 75, and 100 p.ct., &c., on pre-war rates should be known, as to-day it is not quite a 'walk-over' when competing with gas for domestic use."

Accumulated Losses.

It is to be hoped that one of the reforms under the new Electricity Commissioners will be that all local authority electricity undertakings will be compelled to conduct their businesses, so that they are made to pay their way, without having recourse to the common purse of the district, which is fed by the ratepayers generally. Private enterprise in electricity supply has to financially support itself; and it is a violation of the most elementary commercial principles to do as many electricity undertakings are doing at the present time, and have been doing for years past—producing deficits, and obtaining compensation from people who do not desire the service. What justification, for example, can be pleaded on behalf of the Stalybridge, Hyde, Mossley, and Dukinfield Tramways and Electricity Board (whose estimated deficit this year is £3000) for having, since the inception of the undertaking, made a loss of £110,000—averaging in its nineteen years' life £5789 per annum? This is a condition of things which Government Departments should not tolerate, and against which there should be protection of the ratepayers. There is good work here for the Electricity Commissioners and the Ministry of Transport to do, to bring about a reformation.

Loan Interest and Periods.

Money is costing municipal electricity undertakings more just the same as it is doing other businesses. The rate of interest on loans to Metropolitan local authorities has been increased by the London County Council to 5¾ p.ct. Shortly, the sanctioning of loans will be transferred from the Council to the Electricity Commissioners—in fact, as soon as the appointment of the latter has been made. The repayment periods granted by the Council have of late been: Mains, twenty-five years; plant and boilers, fifteen years; house services, twelve years; meters, ten years; powdered fuel plant, ten years; and buildings, thirty years. The inclusion of powdered fuel plant is a matter of fresh interest. The Council are not, in the matter of generating plant, so lenient as the Ministry of Health, who allow twenty years instead of fifteen. On the other hand, they only allow five years for meters. Perhaps when the Electricity Commissioners set to work, they will do something to co-ordinate the periods, though, of course, different areas have conditions about them—such as the character of the subsoil and the chemical state of the atmosphere through the presence of chemical and other industrial establishments—which have a bearing on the duration of the life of plant.

Economy in Water Power.

This country is not wealthy in water power for electricity generation purposes. Mr. S. E. Britton, the Electrical Engineer of Chester, however, makes out a strong case, in an article in the "Electrician," for utilizing such water power as we have got; and he brings the results obtained at Chester in connection with the use of the River Dee to substantiate his contention that there is economy in it. This, of course, presupposes equal conditions. The scheme was inaugurated in 1913. The installation consists of three units—two capable of utilizing per minute 30,000 c.ft. of water, when the fall is 9 ft., and generating 225 KW., and one 22,000 c.ft. per minute, and generating 180 KW. The efficiency of the conversion of the water power to electrical energy is 66 p.ct. The aggregate of the periods when the installation is stopped owing to tidal water is from eight to twelve days per annum. The installation had at March, 1919, formed part of the undertaking for five-and-a-half years; and its influence upon the concern is shown by the comparative figures supplied in the article. The capital cost for the steam section of the undertaking was £42·42 per KW.; and for the water section £29·32 per KW. The units generated and sold were: Steam power, units generated, 10,488,519; sold, 7,224,993. Water power, units generated, 9,600,615; sold, 8,011,977. The difference between the generated and sold units is made up of the energy used on the works, and battery and distribution losses. The generation costs were as follows:

	Steam.		Water.
Fuel	£18,626	..	—
Oil, waste, water, and stores	795	..	£210
Wages	5,208	..	1579
Repairs and maintenance	2,824	..	356
Rents	66	..	552
Insurance	488	..	52
	£28,007		£2749
Per unit sold	0·9308d.	..	0·0823d.

There is one thing about the foregoing, and it is that most charges about the steam plant have risen enormously. In regard to water power, the miners have not a finger in this particular pie. As to the capital charges, the interest on loans on the steam-power plant amounts to £9471, and the sinking-fund charges to £8409—a total of £17,880, or 0·5943d. per unit sold. The corresponding figures for the water power plant are £2714 and £3224—a total of £5938, or 0·1779d. per unit sold. Obviously (remarks Mr. Britton) the foregoing figures are not strictly comparable. They are, however, submitted to show what has actually taken place during the various changes in the last five years.

INCOME-TAX ALLOWANCE ON GAS-WORKS BUILDINGS, &c.

[COMMUNICATED.]

THE provisions of section 24 (4) of the Finance Act, 1918, allowed a deduction in computing profits assessable under Schedule D of the gross Schedule A in the case of mills, factories, and other similar buildings. Electricity and tramway undertakings, which are assessed under Schedule D, came within the scope of the section, but not gas-works, water-works, and similar concerns assessable under the rules of No. III of Schedule A. This anomaly was removed by section 18 (2) of the Finance Act, 1919:

> In estimating the profits for any year of any of the concerns enumerated in Rules 1, 2, and 3 of No. III of the rules applicable to Schedule A, there shall be allowed to be deducted as expenses incurred in any year, on account of any mills, factories, or similar premises owned by the person carrying on the concern and occupied by him for the purpose of such concern, a deduction equal to one-sixth of the annual value of those premises.

Gas undertakings, therefore, are now entitled to an allowance in respect of buildings in the nature of factories—premises which contain machinery operated by mechanical power, and other buildings ancillary thereto.

It would appear that no definite instructions have been issued from headquarters as to what exactly are the buildings which should be included. In the "JOURNAL" for Nov. 25 last (p. 423), there appeared a short, but important, communication from the Secretary of the Gas Companies' Protection Association, in which it was stated that, in the opinion of the Sub-Committee on Income-Tax of the Association, "the allowance in question should be made in respect of buildings, even though not enclosing machinery, where such buildings are in the nature of stores, warehouses, or administrative offices ancillary to, and forming part of, gas-works."

Failing these definite instructions, Local Surveyors of Taxes have been obliged to exercise individual discretion in the interpretation of the section; and it, therefore, naturally follows that there is a want of consistency throughout the country, which is disturbing to all concerned. From inquiries the writer has made in official quarters, it would appear that no objection would be taken to the inclusion of buildings which, though not containing machinery, are in actual contact with buildings which do enclose it. For example, if a workshop formed part of a building which also contained engines, &c., an allowance would be made in respect of the whole of the structure; but if the engine-house and the workshop were two separate buildings, an allowance would be made only in respect of the former. This strikes the ordinary man as a rather fine distinction to draw, although there may be a certain amount of subtle logic in the contention; for if "silent" self-contained buildings within the ambit of a gas-works are included, then it would be difficult to exclude "silent" buildings, such as offices and show-rooms, not situated at the works.

The concession is a valuable one; and gas undertakings that have not done so should immediately take steps to secure the benefit which the section confers. It is not one of those doubtful concessions which take away with the left hand all or the greater part of that given by the right; but it is an allowance which (in the words of the Deputy Chief Inspector of Taxes) "does not in any way affect the right to charge as an expense the ordinary cost of repairs and maintenance in so far as the same would otherwise be allowable."

There are two methods of arriving at the annual value of the buildings. The first is by means of certificates furnished by the Local Assessment Authorities; the second, by fixing the annual value on the basis of 5 p.ct. on the capital cost of the premises existing on March 31, 1918, which should include the site and such part of the fixed plant and machinery as is usually taken into account in fixing the valuation.

In view of the greatly enhanced value of buildings and machinery, it may be argued that the value should be taken as the basis, and not the original cost. Possibly the authorities would reply that this contention would be given effect to as regards future buildings that may be erected, or plant that may be installed, but that in granting an allowance for depreciation (for that is what it really is) on existing buildings and plant, their actual cost should form the basis for computation.

Another argument that might be urged is that 5 p.ct. is too low a percentage. But, after all, it may be best in the end to take up an attitude of "sweet reasonableness" in the matter. Fighting the authorities, and endeavouring to get the uttermost farthing, may result in defeat. The present Deputy Inspector of Taxes (Mr. E. Stanford London, C.B.E.), who may have a good deal to do in the final settlement, has deservedly earned a reputation for large-mindedness in his treatment of public and other bodies; and he is the last man to apply to the problem that "subtle logic" to which the writer has referred, and which is more in place in a Court of Law than in the business world.

The most pressing need is to have an authoritative statement as to the buildings which are ancillary to, and form part of, gas-works. This is a matter which might fittingly engage the attention of the National Gas Council. Meantime, gas undertakings, when paying income-tax demands, should retain a round sum sufficiently large to cover the allowance when ascertained.

Commercial Development Suggestions.

A bulletin of suggestions for the gas industry has been issued by the American Gas Association; and from among them, the following are taken: Plan your sales activities ahead on a twelve months' basis. Endeavour to secure recognition of the sales organization as a permanent body not to be disorganized at any time. Keep a daily, weekly, or monthly record of your gas and appliance sales, on graphic charts, for one year. Make it the business of one man on each chart to tell you what he can find out to account for the fluctuations. Get into order for your company a work schedule—*i.e.*, a time-table for delivery, installation, inspection, &c., of appliances sold. Devise a plan suitable for your organization so that no appliance sold is promised ready for use contrary to the installation department's schedule. Put into practice a definite policy and plan for co-operation with local plumbers during rush seasons, so as to avoid delays in installation. Inspect carefully and promptly all service and appliance installations. Adopt some maintenance plan. Organize and maintain a local architects service bureau. Send your sales manager on at least a trip a year to study sales methods, &c., of other gas companies and local merchants. Study carefully your heating load.

Propane in Natural Gas.

Natural gas is providing much of the gasolene used in the United States, says the "Oil and Gas Journal," and it is keeping the home fires burning in many houses. Also it is driving industrial wheels in many parts. But there are other uses to which natural gas may be put. The recovery of liquid propane and butane from it is commercially profitable. According to an authority on the subject, experiments have demonstrated the feasibility of recovering these substances in absorption gasolene plants, at little additional cost for equipment and operation. Since about the middle of 1917, an auxiliary plant of this kind, having a potential capacity of some 2000 gallons of liquid propane and 2200 gallons of liquid butane a day, has been in operation in Western Virginia. Liquid propane and liquid butane have fuel values from two-and-a-half to three times that of natural gas, and have been found suitable for use in cutting and welding metals, in heating and lighting dwellings, and, with the substitution of a gas-mixer for the carburettor, as a source of power in internal combustion engines. Laboratory experiments have shown the possibility of obtaining from the gaseous forms of propane and butane, under certain conditions, as high as 37 lbs. and 38 lbs. respectively of carbon black per 1000 c.ft. of gas treated.

BENZOL RECOVERY IN FRANCE.

M. Grebel on Policy and Methods.

In the course of a lengthy contribution to "Le Genie Civil" of Nov. 8, M. Grebel, well known as a leading technical authority on gas matters in France, reviews the conditions prevailing in his country at the present time, and with regard to the immediate future, in respect to the recovery of benzol from gas. Inasmuch as M. Grebel has been actively concerned during the war with the debenzolization of gas for national purposes, and as, moreover, his conclusions on the economic aspect of the question differ from those of the French Professional Gas Syndicate, his paper possesses more than ordinary interest, apart from the technical particulars he gives of modern systems of benzol recovery.

M. Grebel to begin with points out that, as a result of the demand by the French munitions authorities, more benzol was recovered in gas-works annually during the war than from coke-ovens in pre-war days—the respective quantities being 16,000 and 18,000 tonnes. Very soon after the armistice, when it was found that the means for storing benzol and benzene were exhausted, an order of the French War Office discontinued the extraction of benzol in gas-works by virtue of a provision of the Act of November, 1915, under which power was given to enforce the extraction of benzol from gas. It is pointed out that an administration consisting of fewer water-tight compartments would have co-operated with the official organization for maintaining supplies of liquid fuel, and would have continued the recovery of benzol, possibly after a temporary reduction, for the purpose of providing a substitute for petrol and for keeping down the price of the latter. A purely technical mind, M. Grebel remarks, would look at the benefit to France of the continued recovery of benzol in gas-works, and might be inclined to impute to the petroleum interest, to the French coking and tar-distilling industry, and to the importers of foreign benzol a desire to suppress a dangerous competitor no doubt without justification, since these groups equally realize the general national interest, as well as the demand for liquid fuel for motor vehicles.

Moreover, gas makers, despite certain arbitrary assumptions to the contrary, are advocates of debenzolization for the sake of the most advantageous use of their products. Some of them, evidently, do not wish to have it continued in their works. Owing to imperfect plant installed during the war, they cannot anticipate any pecuniary benefit, but, on the contrary, suffer additional difficulties, such as those in a works provided with inadequate cooling through naphthalene stoppages in the mains.

In the mind of the uninformed public, misled by the newspapers, it is imagined that the removal of benzol was the cause of the inferior results from gas appliances. If the truth could be made known, it is, of course, the shortage of coal and inferior quality of the latter which must be blamed for lack of pressure and inferiority of gas. To satisfy consumers, they must be given pressure and be supplied with a gas of moderate calorific power (4000 to 4500 calories per cb.m.). But both must be practically constant, as must also the density and the "comburivorous" power. These conditions, however, have not been capable of realization since the latter part of 1914; and there is no immediate prospect of a return to the provisioning of gas-works with coal upon a scale adequate to regulate them.

A further question is the revision of the contracts entered into by gas concessionaires. It will be necessary to take up the question of the price per cb.m., which will require to be raised in accordance with the cost of coal and the demands of labour; and no doubt the result will be a price varying with the cost of coal, as is done in England. Moreover, if calories are not to be allowed to go to waste, the value of gas must be determined otherwise than by its illuminating power. In view of the Government programme for the distribution of gas from coke-ovens and centralized works, the State should exercise control over all these matters by legislation which would enforce debenzolization in gas-works of large and medium size.

The annual production of benzol in gas-works should be from 25,000 to 30,000 tonnes per annum. The removal of the benzol from gas reduces the value of the latter for all heat-producing purposes (including incandescent lighting) by 7 p.ct. This benzol, in the form of gas, represents only 7 to 8 million cb.m., of a total value of 2 million francs—on the basis of from 25c. to 30c. per cb.m.; while as raw material for chemical products, as a solvent, or as liquid fuel, its value is close to that of petrol—exceeding 30 million francs. Thus from the standpoint of general economy this benzol is a more refined product than gas, presenting great advantages in storage and transport and susceptible of very varied use. If, as requires to be emphasized, it is found possible to carbonize in France, with recovery of the bye-products, all the coal corresponding with requirements in the form of metallurgical coke, the coke-ovens in a few years' time would be producing 70,000 tonnes of benzol. If to this amount be added the 30,000 tonnes recoverable from gas-works, the total would more than cover the pre-war consumption of benzol—viz., 80,000 tonnes, of which 68,000 tonnes was imported. This quantity, already considerable, of French-produced liquid fuel could then be ranked with imported petrol, although it is estimated that the total annual consumption of fuel for internal-combustion engines will amount to from 600,000 to 700,000 tonnes in a few years' time.

Although reference has been made only to the chief outlet for benzol—viz., internal-combustion motors and particularly those of vehicles—the requirements of chemical industry must not be underestimated. The consumption of benzol for dyes is estimated by M. Grandmougin at 5000 tonnes; while there are other minor applications in pharmacy, painting, varnish making, treatment of bones and other materials, oil extraction, the rubber industry, lighting, &c. There will no doubt be other uses, as for example the manufacture of synthetic phenol from benzene for the preparation of condensation products of phenol and formalene, such as "bakelite."

Turning to the recovery, rectification, and treatment of benzol, M. Grebel refers to a paper of his of March, 1910, on the "Manufacture of Benzol," and expresses the opinion that no sensational development has taken place in the industry since then. He briefly passes in review the appliances employed for washing gas with heavy oil—viz., scrubbers with wooden grids or other fittings, rotating washers of the Kirkham and Holmes patterns, columns with perforated plates, and atomizer extractors such as the German centrifugal washer of Feld (fig. 1). The vertical shaft of this washer, which rotates at from 100 to 150 revolutions per minute, carries baskets having peripheral perforations. Curved tubes convey the washing liquid to the plates, whence it rises in the basket and is projected through the perforations. The gas, entering the lower part of the apparatus, rises from plate to plate, and thus encounters the streams of atomized liquid. This pattern of washer is appreciably cheaper than the others, but it requires motive power, in addition to the pumping of the liquid, and takes more pressure than rotary washers.

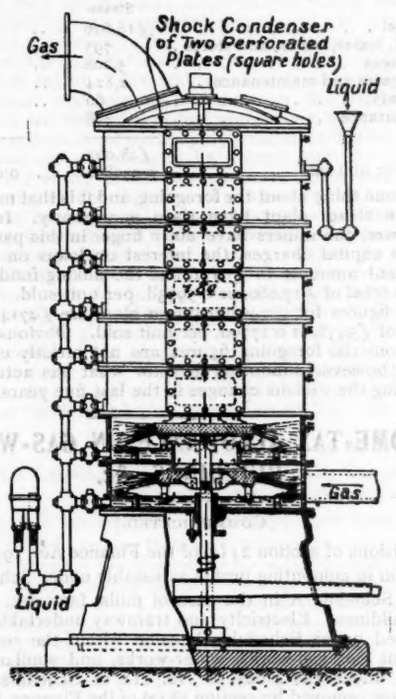


Fig. 1.—Sectional Elevation of Centrifugal Washer.

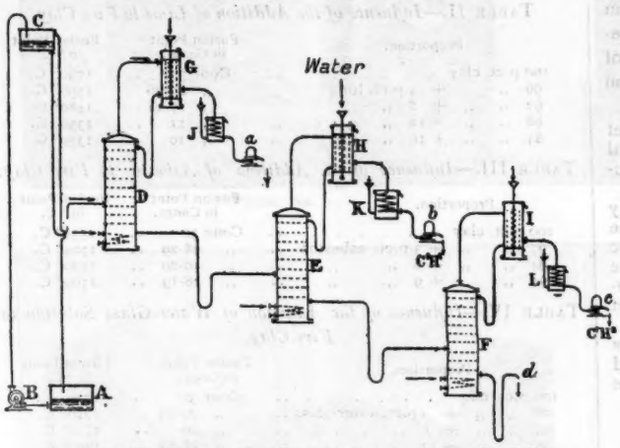
Treatment of the oil for the recovery of the absorbed benzol is generally done according to a continuous process. The benzolized oil is heated by the hot oil from which the benzol has been extracted or by the steam or benzol from the distillation plant. Heat is thus economized. It is pointed out that, in order to render complete the indirect heating of the benzolized oil by steam, the firm of P. Mallet have given up the use of a thermo-syphon and employ coils placed in the plates of the still, as has been done by other French and foreign constructors. The apparatus of Dr. Grasser, with its small-spaced boilers, possesses original features; but others, such as those of von Groeling, Coppée, and Feld, do not introduce any novel principle.

A preliminary rectification of the benzol is done before the chemical washing with sulphuric acid and with soda. M. Grebel states his strong objection, from personal experience, to any attempt to grade benzol before washing. On the contrary, the heavy benzols should be left in admixture with benzene, in order to avoid the drawback of considerable sulphonation which arises even when very weak acids are used with the second jets or crude solvents. The plan of using lime in place of caustic or carbonated soda for the chemical treatment can result at the most in only a small economy.

For the second rectification after working, no marked improvement has been made in apparatus introduced up to the present time. M. Grebel installed, and subsequently controlled, at La Pallice-La Rochelle a works for the treatment and rectification of benzol in what was formerly a petroleum refinery. The columns with their perforated plates, similar to those used by the Société Chimique du Rhone, at Saint Fons, near Lyons, gave complete satisfaction. This type of column acts properly only if fitted

with plenty of stages, which is also a necessary condition for the manufacture of pure products.

Continuous rectification of benzol is a rediscovery on the part of constructors. MM. Semet-Solvay have used it on a large scale for many years past, and have concluded that the process is of value only when operating on 30 tonnes of benzol per twenty-four hours—a figure which M. Grebel thinks excessive.



A.—Benzol reservoir. B.—Benzol pump. C.—Feed regulator. D, E, F.—Rectifying columns. G, H, I.—Grade-separators. J. K, L.—Condensers. *a*.—Outlet valve for light fraction. *b*.—Benzene outlet valve. *c*.—Toluene outlet valve. *d*.—Solvent naphtha outlet.

Fig. 2.—Continuous Rectification Plant for Washed Benzol.

Fig. 2 illustrates plant for continuous rectification. The three columns as well as their respective graders or separators are arranged as a single column. In intermittent rectification, with the separators grading five times the quantity of liquid which escapes from the last rectifier, the whole mass has to be passed through about three times as a rule in order to separate the benzene and toluene from intermediates which are collected below and above the pure products. It can be imagined what must be the separating power of continuous plant to yield benzene and toluene passing over within a few tenths of a degree. The degree of concentration of these pure products in the mass which is treated has also considerable influence on the working. As conditions of avoiding adjustment of the always delicate balance of continuous rectification, it is necessary to have a benzol feed of constant composition, and keep the water temperature as free as possible from variation and the steam at sufficient pressure.

At the time of the armistice, M. Grebel was installing an Egrot continuous rectification plant at the Gennevilliers Gas-Works, designed to treat 35 tonnes of washed benzol per twenty hours. The benzol was of the following composition: Volatile matter, saturated with carbon bisulphide, 1 p.ct.; benzene, 77 p.ct.; toluene, 18 p.ct.; solvent, 4 p.ct. The benzene and toluene obtained in the course of the tests would have come over within less than 10° C. At the same time a Mallet continuous rectification plant at Petit-Quevilly, near Rouen, was being used for petroleums and benzols, especially the heavy portions the treatment of which could not be undertaken at other works. With this plant petrols were rectified for the production of the so-called "aviation" and "white" spirit; but the manufacture was confined to products passing over within some tenths of a degree. It is therefore very evident that plant for the recovery, distillation, and treatment of gas-works benzol does not differ from that for treating coke-oven benzol; and the particulars of the extraction and rectification of benzol at the Beckton Gas-Works have not disclosed any very new feature.

Turning to the French production of benzol, M. Grebel stated the production in 1913 by washing coke-oven gas as 10,400 tonnes; a further 100 tonnes being extracted from coke-oven tar. During the last year of the war, the production of benzol reached:

	Tonnes.
Coke-ovens (despite the non-productiveness of works in the Department du Nord)	8,400
Gas-works	13,000
Tar distilleries	100
Total	21,500

Of the 13,000 tonnes produced by washing coal gas, the contributions of individual works were: Paris, 6480 tonnes; suburban districts, 3150 tonnes; Lyons, 1180 tonnes; Nantes, 480 tonnes; Havre, 400 tonnes; Marseilles, 390 tonnes; Bordeaux, 350 tonnes; St. Etienne, 330 tonnes; Nanterre, 130 tonnes; Toulouse, 110 tonnes—total, 13,000 tonnes. These figures include an allowance for an average loss of 25 p.ct. of the crude benzol. Had the war continued, recovery of benzol would have been done also at Rouen and Nice, although the Munitions Ministry, which at that time was well provided with benzol, had permitted the sale of a portion of the production for other uses than the manufacture of explosives. Other works—such as those of Nancy, Lille, Strasbourg—and others of smaller size, making over 5 million cb.m. per annum, would be in the position, by adopting modern methods, to recover benzol from their gas at a profit even in the event of the price falling to 70 or 60 frs. per 100 kilos. Though works such as those at Lyons could recover up to 40 grams of crude benzol per cb.m. from gas, others, on the contrary, were getting scarcely more than 10 grams, and large works not more than 30 grams. Some concerns would consume as much as 12 kilos of steam per kilo of benzol in distilling the saturated oils. There is therefore ample evidence of the use of badly-designed plant. Many of those intended for the rectification and treatment of benzol for the manufacture of "recette" benzene and toluene, coming over within a few tenths of a degree, were, if possible, still more defective.

Thus the quantity of benzol recoverable in large and medium French gas-works may be put at from 25,000 to 30,000 tonnes in the case of coals yielding 30 to 45 grams of crude benzol per cb.m. It may be estimated that the French gas-works carbonized about 6 million tonnes of coal, more than half of which is used in works where debenzolization could be profitably undertaken. The possible production from existing coke-ovens and from those which will be reinstalled in the Northern Departments can be estimated at 20,000 tonnes. In the event of coke-ovens being laid down in France on a scale corresponding with the national requirements and with the avoidance of the importation of metallurgical coke, 14 million tonnes of coal would be carbonized and 70,000 tonnes of benzol extracted. The apprehension on the part of producers of benzol in reference to the 35,000 tonnes which Germany should deliver to France during the next three years is dismissed as puerile by M. Grebel. Before the war, double this quantity was imported; and French coke-ovens are still a long way from yielding the quantity required.

(To be continued.)

SOME NEW HANDBOOKS.

To his already published works on peat, Mr. Fred. T. Gissing has now added the "Peat Industry Reference Book." [Messrs. Charles Griffin & Co., Ltd., Exeter Street, Strand, price 7s. 6d.] It is of a size convenient for the pocket, and is withal a mine of the most recent scientific data available on the subject with which it deals. With present coal prices and difficulties, peat has come still more to the front; and it is interesting to note that since this pocket-book went to press, the Department of Scientific and Industrial Research have thought it worth while to secure the rights in a German book for translation into English. But, says the author, the need is immediate for the latest information on the mechanical methods of peat-winning and its utilization. In fact, it may be remembered that the development of peat resources formed the subject of a circular issued in July, 1918, by the Controller of Coal Mines. The book is well illustrated; and mention of the headings of the eight sections into which it is divided, will furnish an idea of the scope of its contents. They are: Formation, classification, and composition; working of peat; treatment of raw material; peat and peat products as solid fuel; distillation of peat; peat gas; uses and products other than fuel; and miscellaneous information, tables, &c. The volume of gas to be obtained from 1 cwt. of good English peat is given as 519 c.ft.; and a typical analysis of the composition of peat gas is: Methane, 30 p.ct.; carbon dioxide, 30 p.ct.; hydrogen, 19 p.ct.; carbon monoxide, 14 p.ct.; heavy hydrocarbons, 7 p.ct. For illuminating purposes, the author says, it is probably more economical to convert peat into power gas, and utilize the latter for the generation of electricity. A number of peat gas producer plants are described and illustrated.

The "Practical Engineer" Mechanical Pocket Book [The Technical Publishing Company, Ltd., No. 1, Gough Square, Fleet Street] contains, as usual, sections devoted to gas and oil engines (in which a number of useful tables, &c., are included), gas producers, gas for heating and lighting, and pyrometry. The Editor points out that coal gas is coming into ever-extended use for industrial purposes as its many advantages become recognized; and he names a few of the "thousand-and-one" uses to which it is now being put. Gas-furnace work is dealt with at some length; and separate chapters are devoted to piping and incandescent lighting.

The "Mechanical World Year Book" [Messrs. Emmott & Co., Ltd., King Street, Manchester, price 2s. net] has reached its thirty-third year of publication; and the present edition has been further enlarged, and various new features introduced. The practical nature of the information, and the useful tables, included in this little book are well known. A good many pages are devoted to gas-engines and producers, while there is also a chapter on the subject of Diesel engines.

At a meeting in the Grand Hotel, Sheffield, on Saturday afternoon, the 28th inst., of the Midland Section of the Coke Oven Managers' Association, a series of questions will be introduced for discussion. The questions have been circulated; and the Committee have arranged for answers to be given at the meeting, in order that the discussion may be full.

THE USE OF FIRE-CLAY IN LAYING FIRE-CLAY BRICKS.

By RAYMOND M. HOWE.

[A Paper read before the Refractories Manufacturers' Association, in Chicago, Illinois, Jan. 14.]

In the making of so-called fire-brick mortars, it is common practice to add certain materials to the ground fire-clay. Sometimes these other materials are added by the manufacturers of the mortar; while at other times they are added by the mason entrusted with the laying of the bricks.

Such materials are generally added (1) to make the mortar set firmly without the application of heat, (2) to offset the natural shrinkage of the clay, or (3) to cause it to burn to a dense structure by reason of decreased refractoriness.

Ground silica and alumina are often added; and since the clay itself is composed almost entirely of these materials, this practice is perfectly legitimate. In fact, the general properties of plastic clay can often be improved by making such additions. On the other hand, it is evident that the addition of certain other materials is not justified; and this paper is designed to show the effect of such additions.

In the experiments here reported, a very plastic fire-clay was selected, and different amounts of water-glass, salt, portland cement, carborundum, asbestos, and lime were added. The analysis of the original fire-clay follows:

Analysis of Plastic Fire-Clay Used.

Ignition	11·12
Silica	56·42
Alumina	28·46
Ferric oxide	3·12
Lime	0·52
Magnesia	0·44
Alkalies	0·24
Fusion point, Cone 30	100·32

After the various mixtures had been compounded, small samples of each were fused in the usual type of furnace used in making such determinations. The results of this work are given in the following tables, and are shown graphically.

TABLE I.—*Influence of the Addition of Portland Cement to Fire-Clay.*

Proportion.	Fusion Point in Cones.	Fusion Point in ° C.
100 p.ct. clay	Cone 30	1730° C.
96 ,, ,, + 4 p.ct. cement	,, 27	1670° C.
94 ,, ,, + 6 ,, ,,	,, 20	1530° C.
92 ,, ,, + 8 ,, ,,	,, 19	1510° C.
90 ,, ,, + 10 ,, ,,	,, 15	1430° C.
80 ,, ,, + 20 ,, ,,	,, 13	1390° C.
70 ,, ,, + 30 ,, ,,	,, 11	1350° C.
60 ,, ,, + 40 ,, ,,	,, 8	1290° C.

TABLE II.—*Influence of the Addition of Lime to Fire Clay.*

Proportion.	Fusion Point in Cones.	Fusion Point in ° C.
100 p.ct. clay	Cone 30	1730° C.
96 ,, ,, + 4 p.ct. lime	,, 20-26	1590° C.
92 ,, ,, + 8 ,, ,,	,, 17-18	1480° C.
88 ,, ,, + 12 ,, ,,	,, 11	1350° C.
84 ,, ,, + 16 ,, ,,	,, 10	1330° C.

TABLE III.—*Influence of the Addition of Asbestos to Fire Clay.*

Proportion.	Fusion Point in Cones.	Fusion Point in ° C.
100 p.ct. clay	Cone 30	1730° C.
97 ,, ,, + 3 p.ct. asbestos	,, 28-29	1700° C.
94 ,, ,, + 6 ,, ,,	,, 19-20	1520° C.
91 ,, ,, + 9 ,, ,,	,, 18-19	1500° C.

TABLE IV.—*Influence of the Addition of Water-Glass Solution to Fire-Clay.*

Proportion.	Fusion Point in Cones.	Fusion Point in ° C.
100 p.ct. clay	Cone 30	1730° C.
96 ,, ,, + 4 p.ct. water-glass	,, 29-30	1720° C.
92 ,, ,, + 8 ,, ,,	,, 29	1710° C.
88 ,, ,, + 12 ,, ,,	,, 28-29	1700° C.
84 ,, ,, + 16 ,, ,,	,, 26-27	1660° C.
80 ,, ,, + 20 ,, ,,	,, 26	1650° C.
76 ,, ,, + 24 ,, ,,	,, 20	1530° C.

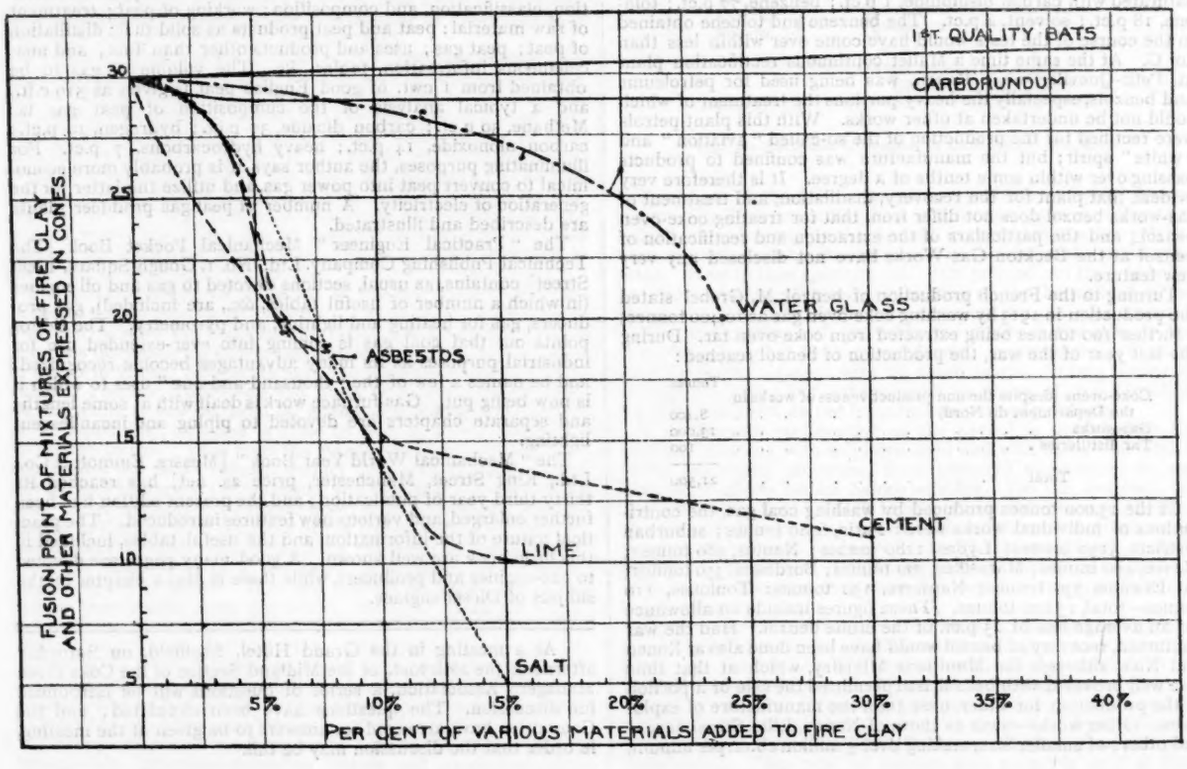
TABLE V.—*Influence of the Addition of Salt to Fire-Clay.*

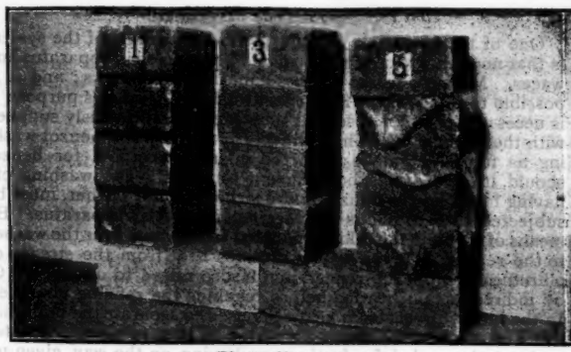
Proportion.	Fusion Point in Cones.	Fusion Point in ° C.
100 p.ct. clay	Cone 30	1730° C.
95 ,, ,, + 5 p.ct. salt	,, 26	1650° C.
90 ,, ,, + 10 ,, ,,	,, 14	1410° C.
85 ,, ,, + 15 ,, ,,	,, 5	1230° C.

TABLE VI.—*Influence of the Addition of Carborundum to Fire-Clay.*

Proportion.	Fusion Point in Cones.	Fusion Point in ° C.
100 p.ct. clay	Cone 30	1730° C.
95 ,, ,, + 5 p.ct. carborundum	,, 29	1710° C.
90 ,, ,, + 10 ,, ,,	,, 29	1710° C.
85 ,, ,, + 15 ,, ,,	,, 29	1710° C.
80 ,, ,, + 20 ,, ,,	,, 29	1710° C.
70 ,, ,, + 30 ,, ,,	,, 29	1710° C.
60 ,, ,, + 40 ,, ,,	,, 29	1710° C.
50 ,, ,, + 50 ,, ,,	,, 29	1710° C.

A careful examination of these data shows very clearly how seriously the addition of lime, portland cement, asbestos, and salt affect the quality of fire-clay; the addition of only 5 p.ct. of these materials lowering the fusion point about 200° Fahr. Water-glass and carborundum did not exert so marked an influence.





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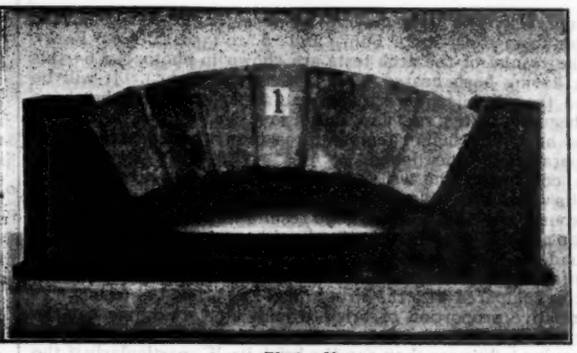

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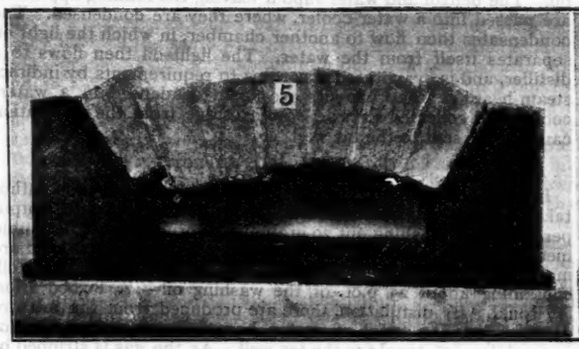

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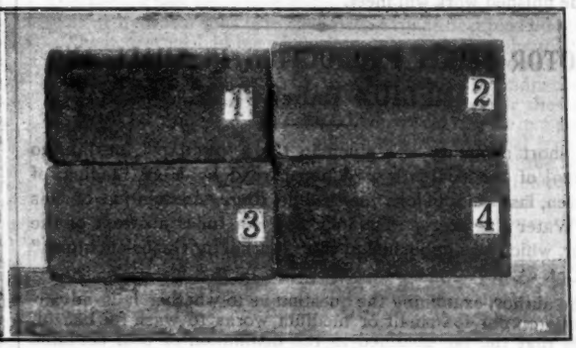

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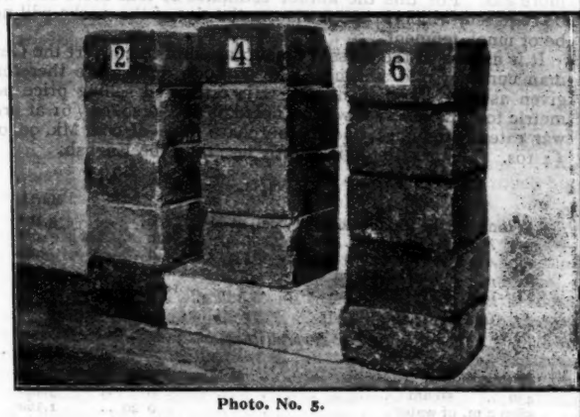

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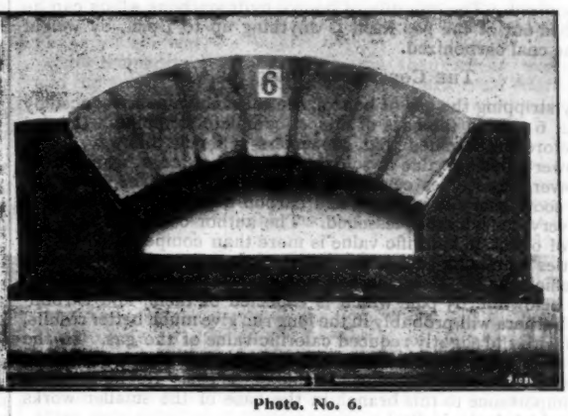


Photo. No. 6.

The combined effect of the addition of asbestos and water-glass to fire-clay may be appreciated more fully if a mortar of the following composition [Mortar No. 1] be studied. The chemical analysis indicates that about 10 p.ct. of each of these materials was added to fire-clay or silica cement in making the mortar.

Analysis of Mortar No. 1.

Ignition	8·94
Silica	72·96
Alumina	7·64
Ferric oxide	1·11
Lime	0·34
Magnesia	3·01
Alkalies	6·76
Fusion point, below Cone 11	100·81

Piers were built in which this mortar was used in making the joints, and after being dried they were placed under a pressure of 11 lbs. per sq. in. and heated.

Photo No. 1 depicts the effect of such treatment. The column marked "1" shows a pier before being heated. The column marked "3" shows the effect of heating to 1100° C. (2012° Fahr.), and the column marked "5" the condition of a pier after being heated to 1250° C. (2282° Fahr.).

Arches were then constructed, using the same mortar in the joints. Photo No. 2 shows a typical arch before being heated, while photo No. 3 shows a similar arch after it had been heated to 1250° C. (2282° Fahr.).

These tests convinced the writer that, although the addition of these materials improved the working and setting properties of the mortar, mortars so made should not be used at high temperatures. If they are used, the foreign ingredients should be used in very small amounts. However, it must be a fact that fire-clay, when used alone, does not give a satisfactory joint for some purposes; otherwise no attempt would be made to improve it.

Much of the dissatisfaction which has attended the use of fire-clay to which no foreign material had been added can be traced to the shrinkage of the fire-clay during the application of heat; for if this tendency to shrink could be overcome, the joints would be firmer and tighter, and would not fall out of the arches.

A more logical way to prevent this shrinkage, and so establish a firmer joint, is not to add foreign materials to the fire-clay, but to use the same material—taking the precaution, however, to add a certain amount of clay which had previously been shrunk.

To demonstrate this, some bats of first quality brick were finely ground and mixed with the same fire-clay as was used in the other experiments. The effect of this addition upon the fusion point of the clay is shown in Table No. VII. and is decidedly favourable.

TABLE VII.—*Influence of the Addition of Ground First-Quality Bats to Fire-Clay.*

Proportion.	Fusion Point in Cones.	Fusion Point in ° C.
100 p.ct. clay	Cone 30	1730° C.
75 " " + 25 p.ct. bats	" 30-31	1740° C.
50 " " + 50 " "	" 31	1750° C.
25 " " + 75 " "	" 31-32	1760° C.

The effect upon the shrinkage is shown in photo. No. 4, where mixture "1" is 25 p.ct. of plastic clay and 75 p.ct. of ground bats; mixture "2" equal quantities of plastic clay and ground bats; "3," 75 p.ct. of plastic clay and 25 p.ct. of ground bats; and "4" all plastic clay. It can be seen that "2"—containing half plastic clay and half ground bats—is far superior to "4," which is plastic clay alone. Laboratory tests also showed that the joints made from the mixture of half ground bats and half plastic clay were stronger than those made from plastic clay alone.

Before passing final judgment upon the merits of such a mixture, however, it was decided to subject it to the same tests as were applied to Mortar No. 1; and photo. No. 5 shows the results of the

column tests—"2" not having been heated, "4" having been heated to 1250° C. (2282° Fahr.) and "6" to 1350° C. (2462° Fahr).

The results of the arch tests are shown in photo. No. 6—this arch having been heated to 1350° C. (2462° Fahr.). It will be noted that these joints are firm and strong, and that they have not begun to soften. As a matter of fact, such joints are stronger when heated to higher temperatures than when heated to the temperature just mentioned.

In conclusion, the writer wishes to emphasize the harmful results which may follow the addition of certain foreign materials to ground fire-clay, and the good results which may be obtained by the addition of ground bats. In either case, the joints should be made as thin as possible—not only to lessen the chance of any harmful results arising from the difference in the structure of the joint as compared with the structure of the brick, but to increase the relative proportion of brick to joint; for at no time can the joint be expected to exert greater resistance to the action of destroying influences than can the brick itself—particularly if the brick has been selected with a view to resisting conditions such as the finished work will meet.

MOTOR SPIRIT PRODUCTION IN SMALL AND MEDIUM GAS-WORKS.

A short summary was given in the "JOURNAL" for Jan. 20 [p. 129] of the contents of a paper read by Herr Steding, of Giessen, last year before the Middle Rhine Association of Gas and Water Engineers. The following is a fuller abstract of the paper, which was published in the "Journal für Gasbeleuchtung" for Oct. 25.

The author, examining the question as to whether it is advantageous or not for small or medium works to wash for benzol, states that the tar obtained in the distillation of coal contains up to 3 p.ct. of benzol hydrocarbons (benzol, toluol, xylol, and solvent naphtha)—that is to say, roughly 0·15 p.ct. of the coal carbonized. The quantity of benzol hydrocarbons which can be washed-out of the gas itself is anything up to 1 p.ct. by weight of the coal carbonized.

THE CONSUMERS' POINT OF VIEW.

By stripping the gas of benzol, the calorific value is reduced by about 6 p.ct. in the case of almost complete stripping. It must therefore be assumed that consumers suffer in this way, if gas of lower calorific value is sold at the same price. Against this, however, he receives certain advantages. By debenzolizing the gas, sooting of the mantles and carbon deposits in the services are very considerably lessened. The author considers that the loss of 6 p.ct. in calorific value is more than compensated by the mantles remaining soot-free. When carbon deposits are present, the efficiency of the burners of cookers, &c., also falls considerably below the 65 p.ct. which is expected of them, and carbon-free burners will probably in the long run give much better results, even with the slightly reduced calorific value of the gas. In the case of internal combustion engines, the author sees no compensation for the reduced calorific value of the gas. But he attaches less importance to this branch in the case of the smaller works with which he is dealing.

ADVANTAGES TO THE GAS-WORKS.

From the gas-works' point of view, there is nothing to be said against debenzolizing. In the first place, naphthalene troubles disappear at once. Not only are no further deposits made in the mains and services, but even those already existing are remedied. Gas of low naphthalene content takes up any deposits found in the mains, and carries them forward with it, finally to the burner. At first a few stoppages may occur in the small services, but eventually complete immunity will be found. At the same time, the specific gravity of the gas supplied is considerably diminished; benzol vapour being about seven times as heavy as coal gas. This fact, together with the freeing of the mains from naphthalene, will obviously be of great advantage from the pressure point of view.

THE NATURE OF GAS PRODUCED.

Naturally, slightly more gas will have to be produced, if it is to be stripped of benzol, and still the same volume is required by consumers. But the author estimates that, even if as much as 30 grammes of benzol are taken out per cubic metre of gas [about 1·85 lbs. per 1000 c.ft.], only 0·9 p.ct. more gas will have to be produced. Of course, if the retorts and other apparatus are already overloaded, benzol washing will have to be omitted on maximum load days, and the same applies in the event of coal supplies falling short of requirements. This means that, at the worst, an increased production of 0·9 p.ct. will be required. On the other hand, it may easily happen that, with improved conditions, the consumers require slightly less gas, and that, with the better pressure conditions, less gas is lost in delivery.

It has been stated, as against benzol washing, that wrought-iron mains suffer more from corrosion with benzol-free gas than usual. The author finds it very difficult to explain this, and the contrary would be expected, since phenols disappear from the gas at the same time as the benzol.

THE APPARATUS REQUIRED.

One of the essentials for the profitable working of the system is that no great extra expense should be incurred in apparatus and wages. Most gas-works possess naphthalene washers; and it is possible to adapt them for benzol washing. For this purpose it is necessary to fit them so that they can be continuously supplied with the washing oil. The same oil can be used for benzol washing as for naphthalene; and the quantity required for benzol should, in most cases, be sufficient for both. The washing oil, having taken up the benzol hydrocarbons in the washer, must be subjected to continuous evaporation in special apparatus. By means of a pump, the oil is conducted from a tank near the washer to the refiner. On the way, it receives heat from the stream of oil returning from the refiner, and is also raised to about 120° C. by indirect steam heating before reaching the refining chamber. In the latter, direct steam heating is used to separate the naphthalene and the benzol; and the washing oil then returns to a water cooler, to be cooled for further use, having, on the way, given up part of its heat, as described above, to the oncoming stream of oil. The benzol and water vapour leaving the refining apparatus are passed into a water-cooler, where they are condensed. The condensates then flow to another chamber, in which the light oil separates itself from the water. The light oil then flows to a distiller, and is evaporated according to requirements by indirect steam-heating. The vapours are again condensed in a water-cooler, and collected for sale. Any residue from the distillation can then be sent to the tar well.

THE FINANCIAL ASPECT.

In estimating the profits to be obtained from benzol, the author takes a works of 3 million cb.m. [about 106 million c.ft.] output per annum. Washing out 20 grammes of crude benzol per cubic metre [1·23 lbs. per 1000 c.ft.], 60,000 kilos. (58 tons) a year are made. This is obtained at first in the form of a mixed light oil, containing about 25 p.ct. of the washing oil—*i.e.*, 80,000 kilos. [77 tons]. By distillation, there are produced from the mixture 53,000 kilos. [51 tons] of motor benzol, leaving a residue of 27,000 kilos. [26 tons] for the tar well. As the gas is stripped of this benzol, it may be necessary to make 17,000 cb.m. [600,000 c.ft.] more gas. For this the author estimates 68 tons more coal will be required, which, in proportion to the size of the works, will not be of much moment.

It is useless at the present time to attempt to convert the German currency into sterling. The author's figures are therefore given as they stand, in marks. His estimated selling price per metric ton of benzol, it will be noted, is Mk. 1220, or £61 at pre-war rate of exchange, and the purchase price of coal Mk. 90, or £4 10s. The metric ton is slightly less than the English.

Receipts.

				Marks.
34 tons of coke (from 68 tons of coal) at Mk.	100	..		3,400
3·4 ,, tar ,, ,, ,, ,,	140	..		476
2 ,, ,, (from the washing oil) ,,	140	..		280
0·14 ,, ammonia . . . . . ,,	800	..		112
53 ,, motor spirit . . . . . ,,	1220	..		64,660
				68,928

Expenditure.

			Marks
68 tons of coal . . . . . at Mk.	90	..	6,120
430 ,, steam . . . . . ,,	8	..	3,440
5800 c.m. of water . . . . . ,,	0·20	..	1,160
2 tons of washing oil . . . . . ,,	250	..	500
Wages			5,400
Amortization, depreciation, &c.—			
15 p.ct. on capital outlay of . . ,,	40,000	..	6,000
			22,620
Net profit.			46,308
			68,928

Or more than 100 p.ct. on the capital outlay.

An Investigation into the Composition of the Unsaturated Hydrocarbons Present in Coal Gas.

In a paper read at a recent meeting of the Society of Public Analysts, Messrs. F. S. Sinnatt, M.B.E., M.Sc. (Tech.), F.I.C., and L. Slater, M.Sc. (Tech.), A.I.C., explained that they had separated the bromine compounds of the unsaturated hydrocarbons present in coal gas in sufficient amounts to enable them to carry out a separation of the more volatile compounds. Their experiments show that the percentage composition of the unsaturated hydrocarbons present in coal gas is as follows:

	First Experiment. Per Cent.		Second Experiment. Per Cent.
Ethylene	84·00	..	84·30
Propylene	13·40	..	11·80
Butylene	1·75	..	2·35
Amylene	0·97	..	1·54

Temporary Increase of Charges Act.—Application has been to the Ministry of Health for Orders under the Statutory Undertakings (Temporary Increase of Charges) Act, 1918, by the Abergavenny Corporation, Brighouse Corporation, Great Driffield Urban Distsict Council, Holme Cultram Urban District Council, and Wallingford Corporation.

FUEL PROBLEMS.

Before the "Graduates' Association" of the Institution of Mechanical Engineers, on Monday evening last week, Dr. Charles Carpenter had promised to give a lecture on "Fuels." Unfortunately, indisposition prevented him from being present at the meeting; but his place was efficiently taken by Mr. E. V. Evans, the Chief Chemist of the South Metropolitan Gas Company, who read the paper that Dr. Carpenter had prepared—the sub-title of which was "The Importance of Associating Chemical Science with the Consideration of the Problems arising out of the Conversion of Fuel into Energy." The engineer should, it was urged, endeavour to glean understanding of the chemist's inspirations by learning at least something of the language in which he expresses them.

The author said that the psychology of the chemist watching a furnace consuming raw coal would probably be something akin to that of a doctor watching a patient taking pickles with his bread-and-milk. In the same way that the science of medicine inculcates respect for the food we put into our stomachs, so also does that of chemistry teach respect for the fuel we put into our furnaces. Chemical knowledge is essential to our understanding of the resultant happenings; and it is to this chemical knowledge, and to this alone, we must turn for an elucidation of the actions and reactions taking place. Imagine science as a sphere of infinite size, from the dimensionless centre of which all inquirers start upon their quest seeking a solution of the problem, "What is matter?"—the chemist, like the rest. To him the atom is the beginning, the unit particle of matter. He pictures these arranging themselves in an enormously great variety of combinations, producing thereby molecules which are in themselves his conception of matter from a chemical standpoint. Now these various combinations or arrangements of matter are so constituted as to possess different qualities or characteristics. They are known, and are peculiar to each particular molecule.

Of all the elemental substances which go to make up so much of the body and envelope of this globe as we are acquainted with, the element carbon is the most important. An atom of it is represented by the letter "C;" and its characteristic feature is that it possesses four arms or tentacles (links or bonds, the chemist calls them), by which it can attach itself to other atoms, and so form molecule. How large, you will ask, is this chemical quadruped? Perhaps the answer is best given in the term used by a well-known physicist: "There are more atoms in a thimbleful of water than there are thimblefuls of water in the oceans of the globe." The carbon atom is not, however, called quadruped but tetravalent, from tetra = four, and valens = equal to. Closely allied to carbon in importance are three other elements—hydrogen with one tentacle, oxygen with two, and nitrogen with three, called respectively monovalent, divalent, and trivalent. There are other monovalent elements besides hydrogen—chlorine, for instance.

With the aid of a blackboard, it was shown what can be done with the methane molecule (CH_4). By unhooking two hydrogen atoms, and hooking on two chlorine atoms, one gets dichlormethane (CH_2Cl_2). Substituting three atoms of chlorine for three hydrogen ones, there results trichlormethane or chloroform. Again, unhooking all the hydrogen atoms, and substituting four atoms of chlorine, one gets tetrachlormethane, a liquid largely used as a solvent. Returning to the original molecule of methane, what is the state of things after having unhooked one of the hydrogen atoms, and before something else is substituted for it? We shall then have the molecule of the methyl group (CH_3)—methyl being the name of the root, or radical as it is called, and from which methane itself has been constructed. From this root or radical, which has no separate existence itself, but occurs only in combination, grow a series of compounds of which methane is the simplest, and which are known as hydrocarbons of the methane group. It was then shown on the blackboard how this building-up is accomplished. Starting from the first compound—methane—which is also the simplest, the first four hydrocarbons of the series are gases. When the fifth—pentane—is reached, the molecule becomes more complex and condenses to a liquid; and after nonadecane ($C_{19}H_{40}$) is reached, the complexity and condensation become still greater, with the result that the remaining members of the series are solids. The first two physical conditions of the gaseous and liquid states are easily imagined. The quality of solids is much more diverse; and these particular ones might be pictured as being of the nature of waxes.

Reference was then made to the two-bond and three-bond series; and the benzene picture was drawn. The number of atoms of carbon and hydrogen contained in the molecule were known long before its picture, the conception of which is owed to Kekulé. If the hydrogen atom at the top of the benzene picture is unhooked, and the methyl radical CH_3 substituted, there results toluene. Both these hydrocarbons, it was remarked, played a most important part in the production of explosive compounds during the war; but it is certain that this advantage could never have been exploited had the composition of these hydrocarbons not been familiar (in the sense described in the lecture) to chemists working upon them.

Having got so far, proceeded the author, let us see if we can apply our knowledge to a consideration of coal. Owing to the great complexity of its composition, the chemist can form but a very imperfect picture of the molecules forming it. You have already in your minds a conception of these various series of hydrocarbons growing in complexity until they appear as waxes. Carry this conception a little further, and assume, as a working hypothesis, that coal is a conglomeration of all these waxes, and we shall have taken our first step towards an appreciation of the difficulties inseparable from its combustion in its ordinary condition of the solid state. Conditions of perfect combustion are most easily achieved where the combustible is gaseous, because the flow or volume of the respective streams of hydrocarbon and oxydizer (or air) can be easily regulated and adjusted. Analysis from time to time of the combustion products affords an easy running guide to the maintenance of the correct proportion. Passing from a consideration of the combustion of gaseous to that of liquid hydrocarbons, the process is of a different character, owing to the greater complexity in the composition of the molecules. The supply of oxygen in exact proportions is a matter of great importance; and there are considerable possibilities of it being incomplete in practice, with the consequent deposition of soot. Another not less important distinction between gaseous and liquid fuels or hydrocarbons is in the relative space occupied by them.

Those present had been asked to take as a hypothetical basis for the constitution of coal the assumption that it was a sort of conglomeration of those waxes which constitute the more complex ends of the various series of hydrocarbons, of which the methyl group was taken as an example. They would now be in a position to realize the complicated happenings when raw coal is thrown on to a furnace. Some of the waxes are slowly melting, others rapidly distilled, some carbonized, some burnt—an innumerable variety of operations going on at the same time, and under all sorts of conditions. No wonder the chemist shudders when he stands before the glowing English fireplace. On the industrial scale, these evils can be palliated by finely grinding the coal, and either blowing it into the furnace with an air-blast or mixing it with a fuel already liquid. Combustion under these conditions applies some of the advantages of the liquid to the solid state. But the great disadvantage must ever be present—namely, that the coal is completely broken-down to its final products of CO_2, H_2O, SO_2, and N, with complete inability to obtain any of the valuable hydrocarbons to which reference had been made. Now in order to use coal in a rational manner, it must undergo preliminary treatment.

Low-temperature carbonization was then briefly explained; and the author went on to remark that, though great efforts have been expended to make the process an industrial success, it is not certain that the stage has been reached. Much depends on the national policy in regard to fuel supplies. If, for instance, the use of raw coal were forbidden, the production of artificial fuels—whether solid, liquid, or gaseous—would be greatly stimulated. The inherent difficulty of low-temperature processes appears to be the friability of the coke residues. The Fuel Research Station at East Greenwich will be looked to for instructive guidance in this problem of far-reaching importance.

Next reference was made to high-temperature distillation; and, by permission of Mr. W. J. A. Butterfield, a statement was circulated showing the resultant products when coal is so treated. Unfortunately, remarked Dr. Carpenter, of the 189 million tons of coal used annually in the United Kingdom, only 30 millions were treated for bye-product recovery during 1913. This condition of affairs is slightly improved to-day. In addition to this, there were exported another 74 million tons in the raw condition. One may well ask whether a large proportion of this should not have been treated at home, and the bye-products—coke included—exported to the foreign users.

Society of Engineers (Incorporated).—The inaugural meeting of the Society of Engineers (Incorporated) was held in the apartments of the Geological Society, Burlington House, on Monday of last week, when Mr. Burnard Green, the President for this year, delivered his address. After referring to the work and utility of the Society and the education and training of engineers, the President dealt with his main theme—"A Few Aspects of the Present Position of Engineering." The premiums awarded for papers read during the year 1919 were presented—the President's gold medal, to Mr. Alfred S. H. Ackermann, B.Sc. (Eng.); the Bessemer premium, to Mr. C. O. Bannister, F.I.C., Assoc.R.S.E.; the Bursey premium, to Prof. James Young; and the Society's premium, to Captain M. E. de Jarny, Croix de Guerre.

Manchester District Institution of Gas Engineers.—The fiftieth annual meeting is to be held at the Midland Hotel, Manchester, on Thursday of next week, at 11.30; and as this will be the jubilee of the foundation of the Institution, the Council are anxious that it should be a memorable one. There is to be luncheon at 1.30, followed by a smoking concert. Sir Dugald Clerk, K.B.E., D.Sc., F.R.S. (the President of the Institution of Gas Engineers), intends to be present at both the meeting and luncheon. The principal business before the meeting will be the Presidential Address of Mr. E. H. Hudson, of Normanton. The report of the Committee to be submitted states that, acting on a suggestion contained in the paper contributed at the October meeting by Mr. W. Buckley and Captain Sinnatt, D.Sc., a Sub-Committee has been appointed to consider the practicability of installing in Manchester, or other convenient town, a central laboratory where gas-works tests could be undertaken and instruction given to works assistants and junior chemists of gas undertakings.

MIDLAND JUNIOR GAS ASSOCIATION.

A Meeting of the Midland Junior Gas Association was held at the Birmingham Council House on Thursday evening last—Mr. C. CARRINGTON BARBER (the President) occupying the chair. There was a representative gathering of members.

Mr. T. H. POULSON, Assistant Gas Engineer, Stafford, read the following paper on

BOOSTING DISTRICT GAS PRESSURES.

In this paper it is my intention to describe the methods adopted, and the machinery used, to increase gas pressures in various parts of Stafford and district. Before doing this, I propose to give particulars of output, and the reasons for installing the plant.

Early in 1917, we were delivering a million c.ft. of gas per day through two 15 in. cast-iron trunk mains, at an initial pressure of 37-10ths at the works; most of this being delivered between the hours of 7.0 a.m. and 9.0 p.m. In various parts of the district pressures dropped to 25-10ths, and in some cases to 12-10ths, from 11 a.m. to 1 p.m. and from 4 p.m. to 6.30 p.m. The decrease in pressure was particularly marked on Sunday mornings, owing to the cooking load being exceptionally heavy. No trunk main-laying or replacement had taken place during the preceding ten years, although many extensions had been made on the fringe of the districts. Consequently, pressures here dropped heavily; and in order to give efficient pressures it was necessary either:

1.—To enlarge the existing low-pressure trunk mains.
2.—To lay two new low-pressure trunk mains.
3.—To install compressing plant, and small feeder-mains.

Suggestion No. 1 would have cost £11,000; No. 2, £8000; and No. 3, £4000.

Suggestion No. 3 was adopted, not only on account of its low initial cost, but also because of the many advantages which the flexibility of the scheme presented.

DESCRIPTION OF THE PLANT.

The compressing plant consists of two rotary compressors, each capable of passing 50,000 c.ft. of gas per hour, at a pressure of 3 lbs. per square inch. The compressors are driven by two 21 H.P. "National" gas-engines, *via* countershafting arranged with fast-and-loose pulleys. The compressors are the Bryan-Donkin Company's standard machines, of the two-blade type, which is especially suitable for pressures higher than those generally found sufficient for exhauster work; the compressor cylinder being bored to the exact oval shape described by the slightly eccentric movement of the blades. The movement of the blades is guided by the central block, which revolves on the fixed axle. Thus all wear upon the cylinder is practically eliminated. The countershaft drive was chosen because it offered the following advantages: (*a*) In case of breakdown, either engine could be used to drive either compressor. (*b*) Starting-up is much easier than if direct-coupled. (*c*) Other machines may be driven from the shaft. In this case, the machines used in the mechanics' shop are driven.

COMPRESSOR CONNECTIONS.

The inlet and outlet pipes are 10 in. diameter, with 10 in. automatic valve and bye-pass. All connections are flanged, and are of cast iron. These pipes, as well as those in connection with the gas-engines, are laid in trenches and covered with chequered plates. The inlet to the compressors is coupled to the gasholder inlet main. This is not an ideal point, as the district may be flooded with lean gas during the periods of shutting-down the carbonizing plant. It was, however, selected because the compressors would relieve the pressure on the water-sealed purifier lutes during the maximum make. As soon as new purifiers are installed, the compressor inlet will be coupled to the holder outlet. An excess pressure valve is fixed on a bye-pass pipe between the inlet and outlet mains, so that the outlet pressure can be adjusted to suit the amount of gas required on the districts. The compressor outlet is connected by a breeches pipe to two 7 in. gas-valves, and from these the feeder-mains begin.

I wish to emphasize the importance of having main inlet and outlet valves to the compressing plant. It is often thought that an inlet and outlet compressor valve is sufficient. But this is not so, for when repairs to connections are necessary, trouble is experienced through gas at holder pressure being on both sides of the automatic bye-pass valve.

BUILDING.

The plant is housed in a brick building, 30 ft. by 28 ft., with 13 ft. clearance to eaves. The roof is carried by four steel principals, and made up of 1 in. tongued and grooved match boarding, covered with "Ruberoid." The walls and floor are tiled. The interesting features of the building are: "Texo" preparation was used as a damp course; and the dryness of the walls has justified its use. The tiling of the walls cost £220. Plastering and painting would have cost £120; but by expending the difference we have walls which do not require painting, and they give little trouble in cleaning. The roof, with its ruberoid covering, is light, cheap, and durable; and there is much less percolation by dust than if tiles or slates had been used.

TEMPERATURE.

Particulars of the rise in temperature which accompanies compression may be of interest, and are as follows:

Pressure.	Inlet Temperature.	Outlet Temperature.
1 lb.	51° Fahr.	84° Fahr.
2 lbs.	50° ,,	97° ,,
3 lbs.	51° ,,	114° ,,

During the period over which the above tests were made, the temperature of the gas at the inlet of a governor situated 750 yards from the works remained constant at 48° Fahr.

FEEDER MAINS.

Three feeder-mains are laid. Two are 7 in. and one 4 in. diameter. They are laid in various directions in the town to supply the necessary amount of gas for works' furnaces, engines, and domestic purposes. From one of the 7 in. feeder-mains, a branch runs to supply two villages, situated respectively 6 and 11 miles from Stafford. This forms the inlet to a 60,000 c.ft. gasholder, from which the supply for the villages is taken. The branch is the only feeder-main from which services are laid. Governors are fixed at the meter inlets. Consequently, the consumers are supplied at low pressure. The other feeder-mains are connected to Reynolds governors, which are fixed underground in various places.

Particulars of the feeders are as follows:

No.	Length.	Size.	Type of Mains.	Joints.
	Yards.	In.		
1	310	7	Solid drawn	Butt welded
	1020	5	,,	,,
2	750	4	,,	S & S welded
	20	7	,,	Butt welded
3	850	6	Lap welded	Screwed
	850	5	,,	S & S welded
No. 3 First Branch	700	6	,,	,,
No. 3 Branch to villages	3700	4	,,	Screwed
	5000	4	Cast-iron	Cast lead joints. Low pressure converted to high pressure

I would here remark that the cast-iron main which was converted from low to high pressure had been in use for 33 years; and it was surprising to find that not more than a dozen joints required repair when the higher pressure was applied.

It will be noticed that several types of joints have been used. The screwed and socketed tubes were laid in connection with a small compressing plant used to supply the villages before the larger compressors were installed. The other tubes were purchased in war time. Personally, I am in favour of the socket and spigot welded type for ordinary districts, and the long sleeve welded type for areas in which subsidence occurs.

LAYING OF MAIN FEEDERS.

I regret it is beyond the scope of a small paper of this sort to give full details of the laying of high-pressure mains. I shall therefore confine myself to giving a brief description of the laying of the feeders, together with a few points which have occurred to me during the laying of same. The feeders are laid, where possible, in the footpaths, with a cover of 15 in. All specials, such as slow bends, tees, and syphons required for the feeders having welded joints, were made on the site. The lower ends of the water outlet pipe from the syphons are cut on the bevel, so that a very small amount of gas is wasted when the condensate has been expelled. At the governor end of each feeder a flange is welded and connected to the governor connections, so that there are no inserted spigot and socket joints on the feeder. The feeders were tested daily by air at a pressure of 50 lbs. per square inch. Each joint was tested by applying engine oil in the same manner as the soapy test for low-pressure mains. The tubes were tested by leaving them under pressure throughout the night, and noting any difference in the gauge pressures.

Great care must be exercised when making specials which are out of the ordinary—say, for instance, a 10 in. by 7 in. by 7 in. breeches pipe—as great strains are caused, due to contraction in cooling after the welding has been done. It is questionable whether the saving in cost over a flanged cast-iron piece is worth the risk of a faulty welded special.

It is often perplexing to decide on which side of the footpath the feeder should be laid; and it is advisable to make test holes before finally deciding. In many cases it will be found cheaper to lay a longer main in order to miss obstructions. In districts where choice is restricted, it will generally be advisable to lay the feeder in the footpath, alongside the low-pressure main; for the gas-services of the low-pressure main will have more cover, the difficulties entailed in putting the long lengths of tube below the services will be reduced, and the road does not need crossing to couple the governor outlet to the low-pressure main.

DISTRICT GOVERNORS.

These governors are each in duplicate, and are of the Reynolds high-pressure district kind. This type consists of a main governor and a secondary governor combined. These work automatically. The main governor opens with the heavy demands for gas, and

closes when the demand becomes small—the secondary governor being then relied upon to supply the gas required. It will therefore be evident that the secondary governor system not only serves to supply the gas required when the consumption is very small; but, by means of the auxiliary bowl, enables additional force to be exerted in opening and closing the main governor when required. In consequence, certainty of action and perfect pressure regulation are obtained over a wide range of gas consumption with perfect accuracy, whatever the fluctuation in the demand for gas.

The governors are very efficient when the difference between the inlet and outlet pressure is not less than 9 in. It is useless to attempt governing when this difference is below 5 in., because there is not sufficient pressure to operate the valves. Consequently, the low-pressure mains are subjected to excessive pressure.

In adjusting the governors, care must be taken that the outlet pressure is (say) 3-10ths below the works governor pressure; otherwise additional pressure will collect in the low-pressure mains, which will be sufficient to close the works governor, and consequently all gas will be delivered through the high-pressure feeder-mains.

The following particulars show the comparative pressure on trunk mains near the governors in various parts of the district—the pressure at the works governors being 37-10ths:

Size of Low-Pressure Trunk Main.	Lowest Recorded Pressure previous to Installation of Compressors.	Lowest Pressure after Installation of Compressors.
In.	In.	In.
10	12-10	33-10
4	12-10	31-10
10	15-10	30-10
6	8-10	30-10

COST OF RUNNING.

At the present time, about 60,000,000 c.ft. of gas per year is being distributed at the following cost:

1,900,000 c.ft. of gas at selling price of 3s. per 1000 c.ft.	£285
Oil	18
Maintenance	65
Interest at 5½ p.ct.	220
Depreciation at 8 p.ct.	320
	£908

or 3·62d. per 1000 c.ft.

The cost of low pressure trunk mains would have been:

Maintenance	£20
Interest at 5½ p.ct.	440
Depreciation at 8 p.ct.	640
	£1100

or 4·39d. per 1000 c.ft.

When considering these costs, it is well to remember that the plant installed is of such a size that the output can be more than doubled for practically the same running costs.

Another important advantage lies in the flexibility of the plant. To give a case in point, some months ago we received an application for the supply of 18,000 c.ft. per hour. The size of the low-pressure main passing the applicant's door was 6 in.—certainly not large enough for this supply as well as for that of the surrounding district. By laying a branch feeder-main of 4 in. diameter, and fixing the necessary governor, &c., an adequate supply was given.

EFFECT ON OUTPUT.

The maintenance of efficient and steady pressures has a considerable bearing on increase of output. The gas delivered over a period of seven months shows an increase of 23 p.ct. over the corresponding period of the preceding year. Of this, it is estimated that 15 p.ct. is due to compression. It has been interesting to note the effects of compressing on the question of naphthalene complaints, which, before the introduction of the plant, was a very serious one to us. For the past five months not one service stoppage has been found due to naphthalene. This absence is, no doubt, partly due to the vertical retorts, which were brought into action at the same time as the compressors. Yet, after so much previous trouble, one would expect to occasionally find naphthalene. In November, there were only 60 complaints, and these were found to be due to liquid lodging in low-lying services and in meter inlets. Similar liquid was also found in the bowls of the Reynolds governors, and on examination was found to consist of benzol and other hydrocarbons.

The reason attributed for the absence of naphthalene is that a portion of the oil intended for lubricating the compressors is carried over with the compressed gas, and acts as a carrier.

ADVANTAGES OF BOOSTING.

The following are some of the advantages of boosting:

1.—Cheap method of distribution.
2.—Constant and steady pressures are assured.
3.—Flexibility enables large supplies to be delivered at short [notice.
4.—Naphthalene troubles reduced.
5.—Fewer stoppages from oxidization of service-pipes.

In conclusion, I would urge the importance of the frequent use of recording pressure gauges, as by their intelligent use much valuable information is gained on various parts of the district.

DISCUSSION.

The CHAIRMAN, in moving a vote of thanks to Mr. Poulson, inquired if any explanation could be given for the stoppages due to oxidation; also what was the reduction in the calorific value due to boosting.

Mr. C. F. W. RENDLE (Redditch), in seconding, observed that the question of boosting against the installation of larger trunk mains was an interesting one, and would have to be faced. In his own experience, the existing trunk main was more disproportionate to the output than was the case at Stafford; so that boosting would not be sufficiently effective. He was therefore putting in larger trunk mains. In his own case, the pressure at the works governors was more than 30 10ths. He decided against steel mains to avoid the wrapping that was necessary to prevent corrosion. He inquired as to how comparison was made regarding the cost of running the two systems, because he appreciated the difficulty in arriving at a basis of comparison.

The resolution was unanimously approved.

Mr. W. BATT (Birmingham) pointed out that no reference was made to the question of oscillation on the outlet of the compressor. If oscillation occurred, what steps were taken? The rise in the outlet temperature, accompanying compression, varied from 84° to 114° Fahr. He thought that this must be on account of the churning of the gas. The temperature would not be so high if some arrangement could be made to allow of a "cut-out," and thus obviate so much gas going through the compressor. Concurrently, too, much power would be saved. This was their experience in Birmingham. As to the steel socket tubes, he considered a depth of 15 in. was too shallow.

Mr. TOMLINSON (Derby) pointed to the methods observed in some industrial works for the collection of hydrocarbon. He inquired if it would not be better, when the gas was compressed, to deliver into a large storage tank with a smaller one beneath; the larger being connected with the mains.

Mr. A. KENDRICK (Birmingham) was of opinion, with regard to the use of certain types of pipes, that the character of the traffic was an important factor. Experience in Birmingham, where the traffic was heavy, showed that a cast-iron main was not suitable, and that steel was the more effective, not only at the joints, but because of the longer length of steel pipes compared with iron. In addition, the former had a long sleeve joint. In future extensions in high-pressure main work, the indications were that steel pipes would be used. The question of coating had not entirely effected the decision in favour of steel mains, because if they were properly coated and finished off in sawdust, the pipes would stand a long time without deterioration. Pipes so protected had been lying open to the atmosphere for some years, and the coating was quite sound. He commented upon the use of the portable booster. It had been of service in outside districts in times of emergency. He quoted one instance of a large works having a heavy gas consumption where the pressure was only 15-10ths. A portable booster, consisting of a fan on a carriage driven by a small gas-engine, was requisitioned; and the pressure was raised by this means to 40-10ths. The same method had been adopted at the British Industries Fair at Castle Bromwich.

Mr. POULSON, in reply, said that with regard to the supply to the outside districts to which he referred, no complaints were received as to naphthalene. This observation also applied to the period when their gas was entirely from horizontal retorts.

The PRESIDENT suggested that perhaps this fact might be due to the long distances over which the gas was carried.

Mr. POULSON said he did not think this was the case, because if there had been any naphthalene it would have been arrested in the holder inlet or outlet, and none had gone forward. If there were any naphthalene, it was, he thought, dissolved out by oil carried in the compressor. As to the stoppage in the service-pipes, this was due, no doubt, to some extent, to the oil carried forward by the compressor. He had not tested as to the calorific value. No trouble was experienced on the score of tightness in the stuffing boxes. Ordinary greased hemp, &c., was used. Neither, so far as he observed, was there oscillation, nor churning. In the temperatures given there was no "return" gas. When the main was tested for leakage, no allowance was made for variations in the temperature of the air in the main; but this would have occasioned only a very small alteration in pressure. He agreed with Mr. Tomlinson that the installation of receivers might be of advantage; but they only worked up to 3 lbs. pressure, as against the 130 lbs. mentioned by Mr. Tomlinson. In regard to the lubrication of the booster, which Mr. Rendle had raised, this was a pump feed through an oil-valve and a hole bored in the shaft. In reference to the use of steel mains, he had seen these, as Mr. Kendrick had mentioned, properly wrapped, exposed to atmospheric conditions, and not in any way deteriorated. He recommended the oiling of the covering at intervals. Steel mains had this advantage over cast iron, that they could easily be adapted from low-pressure to high-pressure work.

Reports of Proceedings of Gas Associations.—Another volume has been added to an already long series, by the issue of the Reports of Proceedings during 1919 of Associations of Gas Engineers and Managers of the United Kingdom. There are ten Associations accounts of whose meetings are included; and the reports (which are reprinted from the pages of the "JOURNAL") extend to about 400 pages.

An Exhibition at Lille.—The "Journal des Usines à Gaz" calls the attention of the gas industry to an International Exhibition which is to be held at Lille, under the auspices of the Municipality, from May to October this year, in the interests of the "Renaissance of Northern France." Three classified groups are of particular interest to the gas industry—those dealing with (1) hygiene, heating, and ventilation; (2) household management, furnishing, and decoration; (3) heating, lighting, and power. The object of the exhibition is to assist the local authorities of the devastated regions in their choice of means of reconstruction; and our French contemporary commends it as an excellent opportunity for the gas industry to show what an important part it can take in such work.

SCOTTISH JUNIOR GAS ASSOCIATION.

EASTERN DISTRICT.

Quarterly Meeting at Kirkcaldy.

The Second Quarterly Meeting of the Association took place on Saturday last at Kirkcaldy; about 25 members being present.

Visit to the Gas-Works.

The members had an opportunity of inspecting the Corporation gas-works. Meeting there early in the afternoon, they were conveyed over the works by Mr. A. T. M'Donald, the Assistant Manager, in the absence of the Manager (Mr. James Kincaid).

The works are fairly old, and were purchased by the Corporation some time ago. The single stop-end horizontal retorts, hand charged, are still in vogue; but this system is likely to undergo a change very soon. An installation of vertical retorts is to be erected in their stead. The annual make at present shows an increase of nearly 10 p.ct. on last year, and during the busy season lately nearly 750,000 c.ft. of gas has been manufactured per week. The holder capacity is 550,000 c.ft. Bryan-Donkin exhausters are installed—one of 80,000 c.ft., the other of 60,000 c.ft. per hour. A compressor (also of Bryan-Donkin make) is in use to boost the gas to Thornton—a distance of 5 miles.

After an interesting hour and a half spent in inspecting the works, the members were entertained to tea in Morrison's Tea Rooms.

The Business Meeting.

Mr. W. Geddes, of the Granton Gas-Works, then read the following paper:

RESTRICTIONS AND RECONSTRUCTION.

Is it a substantial exaggeration to say that had it not been for the gas industry the great war would have had a different ending? I think not. Apart altogether from the heavy drain on the man-power of the industry, rivers of toluol and benzol were poured forth to make high explosives, dyes, and motor spirit substitutes; in the absence of potash manures—largely German products—sulphate of ammonia played an important part in increasing the food supply of this country at a time when shortage was causing the gravest anxiety; while creosote oil was largely used as a fuel by the Navy. Tar also had its uses for road-making and conversion into carbolic for disinfectants.

Lord Moulton, in generous tributes, at various times, has put on record the obligation of the country to our industry at a period when her very existence was threatened. If such inestimable service was rendered—and who doubts it?—then one would naturally expect that generous treatment and the greatest possible freedom from galling restrictions would be granted by a grateful Government. But what did we find? Written everywhere in flaring letters was the hateful word *verboten*. Let it at once be frankly admitted that the carrying-on of a country in a state of war is a task to test the wisest and gauge the strength of the best of men. And, however much our private views may have differed from certain policies, let it be remembered that the State exists to express common purposes, and undertakes common actions on behalf of the whole community. It was consequently the duty of everyone, when Britain was in danger of being overwhelmed by an unscrupulous and remorseless foe, to lighten the burden by throwing overboad the jealously guarded rights and safeguards for the sake of the National weal.

But I do not think that anyone of us was prepared for the blight of bureaucracy which spread throughout the country under the sheltering wings of D.O.R.A. We had, and in some cases still have, restrictions with regard to the sale of our principal commodity, gas, as well as coke, sulphate of ammonia, and other bye-products; while the coal position, owing to the general shortage of supplies, has demanded the closest and the most careful attention. In normal times, the selection of a range of suitable coal is one of the most important matters that engages the attention of the engineer and manager; but during the last few years, undertakings have had to be content with whatever was obtainable under the Coal Controller's regulations. Government Departments, however, are not greatly concerned about the effect—financial or otherwise—which their instructions may have on any particular company; and those of us who have been intimately concerned with this coal question know the anxiety with which those in authority have faced successive week-ends with inadequate stocks. Now that war-time conditions are supposed to be giving way to "the new heaven and the new earth," there is a growing feeling of impatience at the restrictions on freedom of action, and the sooner the fetters are broken the better for the gas industry. We must work out our own salvation.

The Financial Outlook.

During the war years and up till now, the industry cannot be said to have had any settled policy. We could not. Expediency over-ruled all other considerations. The exigencies of the moment have had to be met. This state of affairs cannot, of course, go on indefinitely. Just at present, English companies, working under the sliding-scale arrangement, are viewing the financial outlook with the gravest alarm, and seeking relief by the introduction of a new Bill. While we, in Scotland, have not suffered to anything like the same extent financially, as we have always had the privilege of making the consumer pay, yet the whole position is unsatisfactory both to the producer and to the public. Hemmed in by increasing manufacturing and distribution costs—wages and material—the need for clear vision and well-defined lines of action is imperative. The National Gas Council, I believe, are doing excellent work in rough-hewing the policy of the industry in a general way; but each individual undertaking will require to modify broad principles to suit its particular circumstances.

Only those who know should prophesy. It may, however, be permitted, without in any way aspiring to don the mantle of Elijah, to finger-post one or two roads on which a tentative start has already been made out of the morass in which we find ourselves. In our early student days—I hope we are all students still—the maxim, above all others, which was dinned into our heads with monotonous repetition was that: "Profits are made in the retort-house." To-day, this adage is essentially true, in so far as bad or indifferent planning in the primary manufacturing operation cannot be successfully counterbalanced by the most efficient organization in the subsequent departments. It is of the greatest importance, therefore, that an adequate and up-to date system of carbonization should be adopted. And on every ground—initial expenditure, economy of space, and relative cost of working—verticals seem to have proved their right to be installed by every class of works, large or small.

Complete Gasification.

Equipped, then, with modern carbonizing plant, or using to the best possible advantage that which is at one's hand, the day does not seem to be far distant when it will be the practice not only to gasify the coal, and at a later stage, or, preferably, as part of the first process, also to gasify completely the resultant coke. This means, of course, that a quantity of blue water gas, exactly proportionate to the quantity of coke acted upon, is produced, while consumers receive a straight coal gas with the admixture of blue water gas. At present this process is being carried out in a nibbling way by the passing of steam over the red-hot carbonized charge of coke in the retort. It must, however, be borne in mind that the coke, when so treated, is certainly not so suitable for sale, owing to the increased percentage of ash and the unsuitability of its physical form. But the loss of the coke market, while serious standing alone, shrinks into relative insignificance when compared with the increased yield of gas. When one considers the question for a moment, it does seem rather absurd to bring coal at heavy haulage rates to a works, carbonize it, and, after taking off a few hundredweights in the operation, send it out on another journey at further heavy transport charges. This school of thought contends that, as the illuminating power standard is dead and decently buried, it is the duty of the industry to raise aloft the B.Th.U. banner for the supplying of as cheap a gas as it is possible for heating and power. And they maintain that one B.Th.U. is as good as another. In connection with this question—and it is a very important one—I would remind you that a high quality gas is an offence against D.O.R.A.

The Beilby Report.

And then we have the Beilby report. In this, it was agreed that the following recommendations should be made:

1.—That in future gas should be sold by heat units rather than by cubic feet.
2.—That each undertaking should have the right to declare the calorific value of the gas it intends to supply.
3.—That gas should not contain above a certain proportion of inert constituents, and that it should be supplied at a certain pressure.

If drastic and far-reaching changes are likely to be made in the manufacture of our main product, it is not less probable that the recovery of residuals shall receive greater attention in the future than they have done in the past. It will be absolutely essential that everything recoverable from the gas be worked up into saleable form. For instance, the necessity of producing benzol and toluol for martial purposes has, happily, passed away. But the State is faced with a great transport problem; and it may conceivably happen that instructions will be given that, willy-nilly, these must be again extracted to augment petrol and other motor fuel supplies.

In conclusion, I want to finish on a note of optimism. While the present is full of doubts and difficulties, I firmly believe that the inherent strength of the industry is such that it will find a way out of its troubles, and that the future holds for us promise of long years of usefulness in the public service.

Discussion.

Mr. John Moyes (Edinburgh), who presided over the meeting in the unavoidable absence of both the President and the Vice-President, said the paper gave much room for discussion of various points.

Mr. James Kincaid (the Manager of the Kirkcaldy Gas-Works), who had joined the party, said it gave him much pleasure to see the members of the Junior Association in Kirkcaldy that day. He complimented Mr. Geddes on his very able paper, and on the precise way he had put forward the various difficulties and problems which confronted the gas industry. It was a time for live men in the industry. The demand for gas was greater than ever; and gas undertakings were regaining lost ground every day. There was a great future for gas for heating. In Kirkcaldy, they had had considerable difficulty in getting suitable coal for gas making. He hoped the time would soon come when D.O.R.A. would be a thing of the past. The labour question, too, in

the gas industry was a very serious matter. It was necessary that dependence on labour should, so far as possible, be minimized. Much was being done to help the condition of labour in gas-works. After five years, the demand for reconstruction was great, and they must go ahead. Although there were no indications of costs coming down, they must be prepared to meet the conditions of to-day.

Mr. F. KEILLOR (Largs) said he always advocated getting the most out of a ton of coal both in gas and residual products; but while much saving and reduction in labour could be secured in large works, he would like to hear of any members of small undertakings who had tried economies on their existing plant, and whether they had been successful.

Mr. W. A. DEARDEN (Dunfermline) said Mr. Geddes had spoken of coke after being steamed not being suitable for sale. In vertical retort practice with steaming, many manufacturers preferred the coke from verticals to that from horizontals, owing to the low moisture content. He considered that coke should be sold on its calorific value and ash content.

Mr. A. T. M'DONALD (Kirkcaldy) said in 1914 he was engaged on benzol extraction. In December of that year, the Government were eager to have all the benzol and toluol they could get. With this end in view, much experimenting with various oils was done; and they ultimately succeeded in obtaining about 1 9 gallons of crude benzol per ton of coal carbonized. After all the good work done in this and many other respects by gas undertakings during the war, a grateful Government repaid them with poor supplies of coal and many restrictions. Still, they must carry on; and it was up to every man in the industry to advance the sphere of gas and residuals in every way. Referring to the Beilby report, he considered one B.Th.U. as good as another; and where a gas of 350 B.Th.U. was being employed, it was quite possible that the whole of these units were utilized in contrast to (say) a gas of 450 to 500 B.Th.U., where probably 50 to 100 units were being lost in doing the same work that the lower-grade gas had accomplished. He would like to see a rule made whereby landlords were compelled to put suitable pipes and fittings into houses, and not ¾ in. compo. as many had done. It would relieve both consumer and gas company; and there would be fewer complaints about "bad gas."

Mr. JOHN MOYES spoke of the rising costs of distribution. The new railway rates were serious. He mentioned cases where the increase meant as much as 7s. 6d. in price on one article, and also where certain articles quoted at 39s. a week ago had risen to 60s. in to-day's quotations.

Mr. GEDDES, in replying, said he was glad so profitable a discussion had arisen. Regarding coal troubles, no doubt the Coal Controller's position was no happy one. Personally, he had found him always to be very reasonable and most ready to do what he could to relieve any difficulty.

Mr. Kincaid and the Kirkcaldy Corporation were asked to accept of the Association's thanks for the pleasant afternoon which had been spent.

NITROGENOUS FERTILIZERS IN GERMANY.

A large increase in the sale prices of nitrogenous fertilizers has now taken place in Germany, says the "Chemical Trade Journal," with the sanction of the Ministry for Economy, and after an examination of the existing conditions of production.

In this connection the Association for Protecting the Interests of the Chemical Industry points out that before the war about one-half of these fertilizers was obtained from the ammonia produced at the coke and gas works, and the other half was imported in the form of Chilian nitrate. But the conditions have completely changed during the war, owing to the failure of the import source. Its place has been taken by the atmospheric nitrogen industry, which has become so strong that it has now surpassed the production of the coke and gas works by a considerable amount. The new nitrogen works—both the calcium nitrate works and those using the high-pressure system of the Badische Anilin und Soda Fabrik—use substantially as raw material only coal, electrical energy, and limestone. Since the outbreak of the revolution, the prices of coal and limestone have increased three-fold, and electrical energy by from fivefold to tenfold. As a consequence all the costs of producing fertilizers have advanced, and wages and railway rates have also largely risen.

The price of nitrogen per kilogramme in the form of sulphate of ammonia has hitherto been for fertilizing purposes 3·90 marks, calcium nitrate 3·40 marks, and sodium nitrate 4·40 marks; but considerably higher prices have prevailed for supplies delivered to industrial works, which are not controlled by the Government. Now, however, the quotations have been raised for agricultural purposes to 4·85 marks for calcium nitrate, 5·40 marks for sulphate of ammonia, and 6·50 marks for sodium nitrate. In addition to accommodating sale prices to the increased cost of production, a further reason for the augmentation lies in the desire to stimulate the output—particularly of those works which, under the old prices, were not yielding satisfactory results and were confronted with the question of suspending working. It is stated that, even with the higher sale prices, the foreign prices for nitrogen are still two-and-half times greater than the former, and that it is preferable to raise the expenses of agriculturists for fertilizers, and consequently the prices for agricultural products, than to purchase food and other articles from abroad at a considerably greater expenditure.

The chief parties interested in the production of nitrogen are the coke and gas works, the installations of the Badische Company on the Haber-Bosch system at Merzburg and Oppau (the latter of which has been at a standstill for over a year), the Trostberg hydro-electric works of the Bavarian Nitrogen Works (which use the Caro system), the Hochst Farbwerke, and the Government works at Piesteritz, near Wittenberg, and at Chorzow, Upper Silesia, which employ the Caro system.

As long as the country was at war and the State was practically the only customer, directly and indirectly, the question of the growth in the working expenses did not play a decisive part; but economic limits now come into operation. In the Haber process it is said that the unfavourable course of the increase in the costs of production has been diminished by the acquisition of lignite deposits near Merzburg, and by the enormous extension of the works now in progress. It seems, however, that both these objects are impossible to the same extent in the case of the works based upon the use of coal for the production of electricity, particularly those working the Caro system. With the exception of the Trostberg works of the Bavarian Nitrogen Company, which has an adequate supply of water-power, all the large calcium nitrate works on the Caro process are dependent upon external sources for the supply of electrical energy from coal-fired generating stations. The Government works were designed for a combined output of 70,000 tons of nitrogen per annum, but have not yet reached this level. In addition, difficulties are experienced in obtaining limestone under existing conditions, apart from the high price prevailing for the material. The question of competition among the different producers is excluded by the formation (mentioned some time ago) of a Nitrogen Syndicate, which commenced its activity at the beginning of last June, and which is subject to compulsory regulations in so far as the supply of fertilizers is concerned.

HEAT VALUE REQUIREMENTS WHICH RESTRAIN DEVELOPMENT.

In an article calling for the liberation of the gas industry, which has appeared in the Chicago "Gas Record," Mr. W. D. Wilcox draws attention to some unreasonable and uneconomic burdens from which it is important that the gas industry should be liberated—excessive and discriminatory taxation, the obligation to supply gas to small consumers at a loss, and requirements as to heat value which limit the development of the most efficient methods or use of the most cheaply obtainable materials. With regard to the heat value requirements, he says that when he first began to advocate the use of lower value gas, he met with the query as to whether it would be possible to secure adequate heating with gas of low value. It is still true (crediting low B.Th.U. gas with higher duty in use) that sending out such gas will involve the transmission through pipes from the plant to the point of use of a greater weight and volume. But if the gas manager finds that, balancing items of reduced and increasing cost, there is a net saving, why should he be prevented from making the saving? The only thing which prevents him from so doing is that custom calls for a uniform heat standard throughout a State, applicable alike to big plants and little ones, operated under widely varying conditions. Let every gas company get approval of the quality of gas it elects to supply. Most gas companies will no doubt decide to continue sending out just about the grade of gas they are now supplying; but for quite a number of companies using coal gas, and finding it necessary to considerably increase their capacity, there would be economy in the installation of a generator for the production of blue water gas, to be mixed with the product of the retorts. Apparatus is to be had in which a high thermal efficiency (close upon 80 p.ct.) may be realized in the conversion of coke into water gas. Results will differ; but no gas manager can read the paper by Mr. S. Moore, submitted to the Eastern Counties Gas Managers' Association [see "JOURNAL" for Oct. 7 last], without being convinced that there are possibilities worth consideration in this combination. Apparatus has been developed for many years in which bituminous coals can be completely gasified, producing gas of 350 to 400 B.Th.U., with a bye-product of tar (or with the tar completely consumed, increasing the make of gas). With mains capable of carrying more gas, there is no difficulty in sending out the increased volume which a reduction in heat value may render necessary. Why not remove the burden of over-regulation, and allow gas companies entire freedom in working-out the problem of giving a service that will attract and hold patronage at a profit to themselves?

The will has been proved of the late Mr. William Gadd, of Manchester, who left personal estate of the value of £5624.

Mr. Thomas Chambers Newton, the Chairman and Joint Managing Director of Messrs. Newton, Chambers, & Co., Ltd., who died last November, aged 76 years, left estate of the gross value of £143,118, with net personalty £139,192.

There will be a meeting on Saturday afternoon of the Yorkshire Junior Gas Association, at the gas show-rooms in Darley Street of the Bradford Corporation, at which Mr. G. Dougill (the Senior Vice-President) will address the members on the "Working-Up of the Products of Tar Distillation."

The deepest well in the world is in the neighbourhood of Fairmont (W. Va.), drilled by the Hope Natural Gas Company, of Pittsburgh. It is 7579 ft. deep. The well had to be abandoned because the drilling tools stuck in the drill-hole. The cable parted, and left the tools and 4000 ft. of cable in the hole.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

The British Association Deputation to the Board of Trade.

SIR,—With reference to the preliminary report which has appeared in the Press, including the "JOURNAL," of the meeting of the British Association Fuel Economy Committee with the President of the Board of Trade, I find that I am incorrectly reported as having said that the minimum number of B.Th.U. in gas should be not less than 450 *net*. What I did say was 450 B.Th.U. *gross*; and I should be glad if you would favour me by making this correction in your next issue.

H. JAMES YATES.

Essex Works, Aston, Birmingham,
Feb. 13, 1920.

[The official account of the proceedings appearing in the "Board of Trade Journal" states that Mr. Yates said "net."—ED. G.J.]

SIR,—With regard to the deputation of the British Association Fuel Economy Committee to the President of the Board of Trade, I desire to say that Mr. H. James Yates, a member of the deputation, was quite wrong when he said that a large part of the existing gas appliances would become useless if gas of lower efficiency than 450 B.Th.U. net was supplied.

The quality of the gas in Greenock for a considerable time back has been of 425 B.Th.U. gross, and not a single piece of apparatus has had to be scrapped.

In this town there are 15,173 cooking and heating appliances in use, not to mention thousands of gas fires, rings, irons, gas furnaces, &c., privately owned.

Our experience proves that there is no difficulty at all in using gas of 400 B.Th.U. gross in these appliances.

GEO. KEILLOR, Engineer and Manager.

Greenock Corporation Gas Department,
Feb. 12, 1920.

The Metric System and the Gas Industry.

SIR,—With reference to your notice of the report of the Chief Inspector of Weights and Measures for Canada ["JOURNAL," Jan. 27, p. 206] in which he refers to letters of the World Trade Club that have been very widely circulated in America and here, I may state that the petitions enclosed in the letters are addressed to President Wilson and to our Board of Trade. It is not surprising, therefore, that (as stated) the Canadian Government has not received "one such written demand."

The Decimal Association has undertaken the counting and classification of the petitions received by the Board of Trade; and already about 3100 have been delivered. Of these 98·4 p.ct. are in favour of the metric system. Many of the cards come from Canada.

Mr. Way contrasts the adoption by individual firms of motor transport with the fact that the metric system has made comparatively little headway in individual cases. The two cases are entirely incomparable. It is open to any individual trader or manufacturer to change his methods of transport, since in doing so he does nothing to affect his relations with those to whom he delivers his goods. It is a matter of internal economy alone. So long, however, as two systems of weights and measures are legal, he cannot be sure that those with whom he deals will fall into line with him; and he must, therefore, await legislative action. Without such legislative action, Daylight Saving—most beneficial though it is generally admitted to be—would never have been adopted here. Imagine Manchester putting its clocks on, while London did not! Kynochs tried to use the kilogram exclusively; but the railway companies could not weigh their goods in metric terms, and so that great firm is compelled to wait for legislative action before it can use an efficient system in its factories.

As to the statement that many advocates of the metric system are theorists—of course, they are; but the great majority of our members are manufacturers and shippers.

The use of decimals is rapidly increasing here; but they involve conversions, with consequent waste of time and risk of error. Clerks are trained to decimalize at sight £ s. d. and tons, cwts., qrs., and lbs., in order to make their calculations with a slide-rule or calculating machine, and then reconvert the result to a jumble of anachronisms. Only when we have complete decimal systems of coinage, weights, and measures, consonant with our notation, will true economy of working be practicable. There is only one decimal system of weights and measures in existence—the metric; and it has been entirely successful in every country where it has been properly introduced. A trade-unionist wrote me recently: "I worked on the metric system at Messrs. —— & ——, and when I left them and went back to our Anglo-idiot system, it was like putting back the clock."

G. E. M. JOHNSON, Secretary, Decimal Association.

Finsbury Pavement House, E.C.,
Feb. 9, 1920.

National Association of Gas Officials.

SIR,—As I have somewhat recently jumped out of the proverbial frying pan, but not into the proverbial fire, I shall have difficulty in deciding whether it will be my duty to join this Association if invited to do so.

A good deal has been said and written about the manager's salary, but very little about the conditions under which he works. For a considerable time I was compelled by an unsympathetic Board—to use very temperate language—to live in a damp, sunless, and unhealthy spot. Having obtained another appointment, and living in one of the best houses in the place, I should like to make this remark in the hope that it may be a help to some of my less fortunate brethren. In my opinion, besides being quite unnecessary, it is a cruelty to expect the brainworker to live on the works, where his own nerves and health, and those of his wife and family, are very often shattered.

Might I suggest to the powers that be, that undertakings would be no worse off—in fact would probably be better served—were they to see to it that their engineer resided out of earshot of elevator, blower, pumps, &c.

CONTENTED.

Feb. 14, 1920.

An Optimistic Note from Canada.

SIR,—In reading recent copies of the "JOURNAL," I have been greatly struck by the pessimistic outlook on life that seems to be shared by all your contributors. Why is this thus?

One finds men of every period, their eyes gripped by the past, looking forward (if they look at all) only to shudder and to fear. The children of these men of little faith stand aghast at the prospect of what may happen to the world in the dark days that are ahead. We do not have to be told that we are going to have trying times. We know it. You cannot shake the earth from its very foundation, and expect to set back again without a jar; but like Æneas of old, we should be able to say: "Forsan et haec olim meminissi juvabit."

We are standing at the very threshold of national prosperity, with our eyes closed to the glorious future just beyond. There is a thrill in the thought of days ahead—with the risings of people long oppressed, and the overturn of customs long outgrown. It may be pleasant to read the history of the past; but the wise man does his historical reading at night, when the day's work is done. During the working hours, he keeps his eyes open on the great and glorious and thrilling future. For eyes were made to look forward—that is why they were placed in the front of our heads.

R. C. CAUTELO.

Booth Street, Ottawa, Canada,
Jan. 30, 1920.

REGISTER OF PATENTS.

Low-Temperature Destructive Distillation of Coal.

No. 137,572.

SWINBURNE, J., of Victoria Street, Westminster.

No. 261; Jan. 4, 1919.

This invention, referring to the distillation of coal, has for its object to work in such a way as to get a rich gas, oil resembling crude petroleum, and a coke that ignites easily.

The process of distilling the coal at a low temperature consists essentially in using metallic electrical resistances arranged within a stationary charge so as to subdivide it. The resistances are distributed among the charge, so that the heat has never a long distance to go. The retorts are fairly large chambers holding, for instance, 100 tons of coal each. No illustration is given in the specification; but, as the patentee remarks, as the capital and labour costs per ton of coal treated are very low, the coal may be carbonized very slowly—for example, in 44 hours. Each piece of coal is then raised very slowly through the range of temperature in which it decomposes. It then gives off rich gas, and an oil resembling crude petroleum, except that it generally contains a substantial percentage of cresol.

The electrical resistances may be arranged in circuits coupled-up to a source metallically; or they may be excited by alternate current induction. The distillation is carried out slowly, practically between 200° and 350° C.

The ordinary practice in low temperature distillation of coal is, it is pointed out, to carbonize at a temperature of not less, and generally more, than 500° C. at the outside of the retorts, and to work a charge through in four or five hours. The patentee prefers to devote a day, or two days, to a charge. The coal is then distilled so slowly that each piece gives off its oil and gas at a low temperature; and the oil is never heated so as to "crack" it enough to matter. Ordinary low-temperature oil according to old practice is thin, and contains a great amount of olefines. According to general recent practice, it is more strongly heated and contains not only olefines but a large proportion of closed chain bodies. But according to the present invention, it is distilled below its cracking temperature—a temperature that varies with the different kinds of coal, but generally neither the coal nor the oil should be heated above 350° C.

Gas-Producers.—No. 137,647.

WEST, J., of Southport, and WILD, W., of Blackpool.

No, 4010; Feb. 18, 1919.

This invention relates to gas-producers, and has for its object to provide an improved arrangement of furnace grate therefor in which cooling of the latter is effected without the necessity for a stream of water over the grate; the construction being such that clinkering of the grate at frequent intervals, as is at present usual, is rendered practically unnecessary, resulting in a more regular and constant production of producer gas and considerable economy of labour.

According to this invention, the grate is formed from fire-bars, which may be vertical or inclined to provide for the ingress of air, and above the grate is a header, one side of which is heated by the furnace. The header contains water maintained at a constant level by float-controlled means external to the header, in any ordinary manner. Preferably, the header is so shaped that the side in contact with the hot coke within the furnace is always water covered, while there is a steam space at the opposite side into which extend the upper ends of steam-pipes delivering the steam generated in the header into the ashpit, so that it is drawn into the furnace with the air supply.

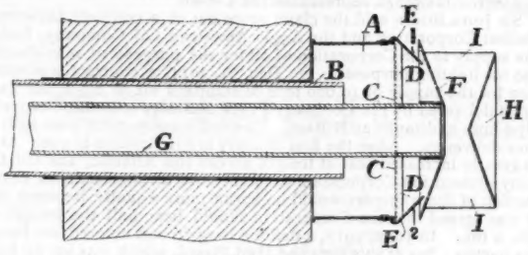
The fire-bars are preferably placed in position singly, and are held against displacement by locking bars, which can be removed to permit of the renewal of any of the bars. The header has hand holes with covers thereon to permit of it being cleared from any scale or impurities deposited by the water.

Gas-Heating Apparatus.—No. 137,705.

LEA, F. M. & D. H., of Birmingham.

No. 8868 ; April 8, 1919.

This gas-heating apparatus is of the type in which an enclosed atmospheric burner is used in conjunction with an expansion pipe or chamber which communicates with an outlet pipe situated at or about the same level as the burner. The object of the invention is "to avoid the detrimental effects on the working of the system of strong air gusts acting on the open end of the outlet pipe." The invention comprises the use of a protecting baffle on the outlet pipe.



Lea's Gas-Heating Apparatus.

In the longitudinal section is shown a baffle constructed in accordance with the invention. A hollow cylindrical sheet-metal box A is fitted to the outer end of the outlet pipe B. In the outer face of the boss a transverse slot C is formed, the width and length of which is sufficient to provide the desired unimpeded outflow of spent gases. The longitudinal edges of the slot are bent outwardly to form lips D, which serve to deflect air currents traversing the face of the box and direct them from the slot. Likewise over each end of the slot is arranged an inclined deflecting baffle E, which prevents direct access of air current to the box. Over the front of the box (at a convenient distance from it) is secured a conical cover F, having its central part situated at a greater distance from the box than the peripheral edge or base. Such a baffle effectively prevents any interference with the working of the system by strong air guests, and "consequently enables a steady condition of pressure or flow to be maintained within the system."

When an air preheater G is arranged longitudinally within (and coterminous with) the baffle box, the latter is adapted for the passage through it of the outer end of the air-pipe; and on the exterior of the conical cover is secured an end baffle H, of conical form, with intermediate radial vanes I, for protecting the outer end of the air-pipe and preventing excessive pressure variations in the pipe due to air gusts.

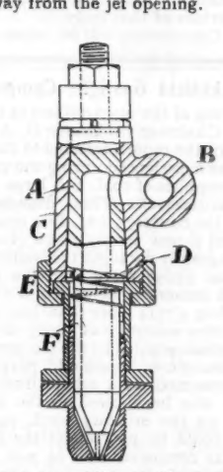
Stop-Cock and Bunsen Nipple Regulator.

No. 137,738.

AIRD, K., and CHALMERS, R. B., of Falkirk.

No. 12,878 ; May 22, 1919.

This invention relates to a combined stop-cock and bunsen nipple regulator for gas-fires, heaters, &c., with provision for the automatic variation of the area of the jet opening controlled by the regulator concomittantly with the variation of the extent of opening of the stop-cock—the plug being formed with a cam for effecting axial movement of the needle-valve. The plug of the stop-cock is formed with a face cam engaged by a follower fixed to, or integral with, the regulator needle, so that in the partial rotation of the plug the needle is moved axially towards or away from the jet opening.



Aird and Chalmers' Bunsen Nipple Regulator.

As shown, A denotes a hollow plug formed with a lateral port, and adapted to be partially rotated between limiting positions by the operation of a lever fitted to the stem, so as to control communication between the interior of the plug and the gas supply connection B to the plug casing C. The open end of the plug—that is, the end remote from the lever—is formed with a face cam D tracked by a follower E formed integral with the spring-pressed needle-valve F; the latter being similar to that described in patent No.12,837 of 1908 and arranged to control the jet opening. Partial rotation of the plug, and therewith of the face cam, will then be accompanied by axial movement of the needle valve in relation to the opening in the nipple.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF COMMONS.

PUBLIC UTILITY COMPANIES (CAPITAL ISSUES) BILL.

The following is the text of a Bill presented by Sir Auckland Geddes, supported by Mr. Bridgeman, to provide for the variation of the provisions regulating the raising of capital by companies carrying on certain statutory undertakings.

POWERS UNDER PROVISIONS OF SPECIAL ACTS AND ORDERS AS TO CAPITAL ISSUES.

1.—(1) Where a company are authorized by Special Act to raise capital by the issue of stock or the borrowing of money for the purpose of carrying on any gas or water undertaking, the company may, if they think fit, notwithstanding anything in the Special Act, with the consent of the Board of Trade, which consent may be given subject to such terms and conditions as appear to the Board to be expedient :

(*a*) Offer for sale by auction or tender any such stock at a reserve price lower than the nominal amount of the stock.

(*b*) Where the Special Act authorizes the creation and issue of ordinary stock, create and issue redeemable or irredeemable preference stock in lieu thereof.

(*c*) Where the Special Act authorizes the creation and issue of irredeemable preference or debenture stock, create and issue redeemable preference or debenture stock.

(*d*) Where the Special Act authorizes the creation and issue of debenture stock or the borrowing of money to a limited extent, create and issue debenture stock or borrow money to an extent not exceeding half the share capital for the time being issued and paid up.

(*e*) Pay a higher rate of dividend or interest on preference stock or debenture stock or money borrowed than that authorized by the Special Act :

Provided that—

(i) Preference stock, whether redeemable or otherwise, shall not be issued under the authority of this Act to a greater extent than would enable the company to obtain an amount equal to the the nominal amount of the stock authorized by the Special Act ; and

(ii) no consent given by the Board of Trade in pursuance of this Act shall have effect until a report of the circumstances of the case has been presented to Parliament by the Board of Trade and has lain upon the table of each House of Parliament for a period of not less than twenty-one days during which the House has sat ; and if either House during that period presents an address to His Majesty praying that consent may be withheld, no such consent shall be given ; and

(iii) the provsions contained in the Schedule to this Act shall apply in respect of irredeemable preference or debenture stock issued in pursuance of this Act.

(2) For the purposes of this Act, the expressions "stock" and "stockholder" include shares and shareholder. The expression "Special Act" includes Provisional Orders and Orders having the force of an Act of Parliament.

SHORT TITLE AND DURATION.

2.—(1) This Act may be cited as the Public Utility Companies (Capital Issues) Act, 1920.

(2) This Act shall continue in force for two years and no longer, unless Parliament otherwise determines. But the expiration of this Act shall not affect the validity of anything done in pursuance thereof.

SCHEDULE.

PROVISIONS RELATING TO REDEEMABLE STOCK.

1. The company may create and issue any preference or debenture stock which they are authorized to create and issue so as to be redeemable on such terms and conditions as may be specified in a resolution of the company passed at a special meeting convened for the purpose.

2. If it is so provided in the resolution, the company may :

(i) Call in and pay off the stock, or any part thereof, at any time before the date fixed for redemption.

(ii) Redeem the stock, or any part thereof, or issue to any stockholder, subject to his consent, other stock in substitution therefor, and may, for the purpose of providing money for paying off the stock or providing substituted stock, create and issue new stock (redeemable or irredeemable) and re-issue stock originally created and issued as aforesaid ; so, however, that the re-issue for the purpose of any particular class of stock does not make the total nominal amount of such stock exceed the amount of that class of stock which the company are for the time being authorized to create.

3. The company shall not redeem out of revenue any preference or debenture stock so created and issued as aforesaid.

Opening of the Session.

The Second Session of the Thirty-First Parliament of the United Kingdom was opened last Tuesday.

Bills to Originate in the House of Lords.

The following Bills will originate in the House of Lords : Maidenhead Gas Bill, Masham Urban District Council Bill, Newtownwards Urban District Council Bill, Risca Urban District Council Bill, Rugby Gas Bill, South Metropolitan Gas Bill, South Suburban Gas Bill, and Wandsworth, Wimbledon, and Epsom District Gas Bill.

Petitions against Private Bills.

Petitions have been presented against the following Bills:

Brighton and Hove Gas Bill, by the Brighton Corporation, the Hove Corporation, the Portslade-by-Sea Urban District Council, the Shoreham-by-Sea and the Southwick Urban District Councils.

Great Northern Railway Bill, by the Bradford Corporation, the Gas Companies' Protection Association, the Gas Light and Coke Company, the Hornsey Gas Company, the Louth Gas Light Company, the Luton Gas Company, the North Middlesex Gas Company, the Southgate and District Gas Company, the Wakefield Gas Light Company, and a number of Municipalities.

Halifax Corporation Bill, by the Yorkshire Electric Power Company, the Brighouse Corporation, and the Huddersfield Corporation.

London Council (Tramways and Improvements) Bill, by the Gas Light and Coke Company.

Newcastle-upon-Tyne Corporation Bill, by the Newcastle-upon-Tyne and Gateshead Gas Company and the Walker and Wallsend Union Gas Company.

Portsmouth Corporation Bill, by the Portsea Island Gas Light Company.

Redcar Gas Bill, by the North-Eastern Railway Company.

South Metropolitan Gas Bill, by the Borough of Wandsworth.

Southend-on-Sea Gas Bill, by the Midland Railway Company.

Wandsworth, Wimbledon, and Epsom District Gas Bill, by the Borough of Wandsworth.

Bills Read the First Time.

In the House of Lords, the following Bills were read the first time: Masham Urban District Council Bill, Newtownards Urban District Council Bill, Risca Urban District Council Bill, Salford Corporation Bill.

The following were read the first time, and referred to the Examiners: Maidenhead Gas Bill, Rugby Gas Bill, South Metropolitan Gas Bill, South Suburban Gas Bill, Wandsworth, Wimbledon, and Epsom District Gas Bill.

In the House of Commons, the following Bills have been read the first time: Blackpool Improvement Bill, Brighton and Hove Gas Bill, Coventry Corporation Bill, Great Northern Railway Bill, Halifax Corporation Bill, Pontypridd Urban District Council Bill, Redcar Gas Bill, Rochester, Chatham, and Gillingham Gas Bill, Southend-on-Sea Gas Bill, Tredegar Urban District Council Bill.

Compliance with Standing Orders.

Certificates from the Examiners showed that the further Standing Orders applicable to the following Bills had been complied with: Blackpool Improvement Bill, Brighton and Hove Gas Bill, Coventry Corporation Bill, Halifax Corporation Bill, Maidenhead Gas Bill, Masham Urban District Council Bill, Newtownards Urban District Council Bill, Pontypridd Urban District Council Bill, Redcar Gas Bill, Risca Urban District Council Bill, Rochester, Chatham, and Gillingham Gas Bill, Rugby Gas Bill, Salford Corporation, Southend-on-Sea Gas Bill, South Metropolitan Gas Bill, South Suburban Gas Bill, Tredegar Urban District Council Bill, Wandsworth, Wimbledon, and Epsom District Gas Bill.

Sheffield and Sunderland Gas Purchase Bills.

The Sheffield Corporation have withdrawn from their deposited Bill all the clauses empowering the Corporation to purchase compulsorily the undertaking of the Sheffield Gas Company.

The Bill of the Sunderland Corporation, to enable them to acquire the undertaking of the Sunderland Gas Company, has been dropped.

Home Production of Motor Fuel.

Sir HARRY BRITTAIN asked the Prime Minister whether, in view of the rapidly increasing price of foreign-imported petrol, the Government proposed to take any steps to extend the supply from British sources (if so, in what directions); whether he was aware that at the time of the armistice an average of 30,000,000 gallons of benzol per annum was being produced in this country, and that to-day this output had dropped to less than 20,000,000 gallons; whether, seeing that it had been proved by official tests that the British-produced material was far superior to the imported article, a successful effort to increase the manufacture of motor spirit in these islands would not only assist British industry, but would also eliminate the risk of being dependent upon external supplies for this all-important fuel; and whether he would give serious consideration to the proposal that all benzol made in this country be handled by the National Benzol Association.

The PRIME MINISTER replied that the Government were fully alive to the importance of this matter, and were prepared to give every encouragement to the production of motor fuel manufactured in this country. He was aware that the output of benzol was less than it was during the war, and he hoped that it would eventually be increased, though he doubted whether it could ever supply the whole of our demand for motor spirit. The question of the agencies by which it was put on to the market was hardly one in which the Government could interfere.

York Gas Company.—Dividends are recommended making 4 p ct for the year on the preference stock and 3 p.ct. on the ordinary stock (both less tax), which will leave a balance of net revenue to be carried forward of £11,403. The quantity of gas sold during the past year was 615,625,800 c.ft., being an increase of 62,908,500 c.ft. The Directors report with deep regret the death of their colleague, Mr. John R. Hill, who had been a Director for upwards of 35 years, during 14 years of which he was Chairman of the Company.

Coal Purchase by the Manchester Corporation.—At a special meeting of the Manchester City Council to-morrow [Wednesday], a proposal will be considered for the appointment of representatives to confer on the establishment of a Central Coal Purchasing Department. The question of the advisability of the Corporation purchasing their own sources of supply of coal for use in the gas, electricity, and other departments of the Corporation will also be discussed. These matters were on the *agenda* for the last monthly meeting of the Council, but discussion was postponed.

LEGAL INTELLIGENCE.

BELFAST CORPORATION GAS-OIL CONTRACT.

Intervention of the Pool Board.

The Defence of the Realm Losses Commission on Monday of last week heard a claim by the Corporation of Belfast.

Sir JOHN SIMON, K.C., appeared for the Corporation; and the SOLICITOR-GENERAL represented the Crown.

Sir JOHN SIMON said the claim arose out of a contract between the Belfast Corporation and the Anglo-American Oil Company, Ltd., for the supply to the Corporation of oil for the purpose of manufacturing gas for lighting purposes. On Dec. 31, 1914, a contract was entered into for the supply of 10,000 tons of standard oil at 2 5/16d. per gallon, to be delivered by the Company's tank steamers into the Corporation pipe-lines and tanks at Belfast. The full consignment was split into four deliveries. After the first delivery in 1916 trouble began. Owing to greatly increased cost of freight across the Atlantic, the Oil Company pressed the Corporation to modify the arrangement, so that the burden of the transport would be borne more equally between them. It was agreed that the Corporation should bear half the freight over 18s. a ton. In June, 1917, a definite bargain was entered into between the parties; but at this time the Pool Board, which was set-up by the Board of Trade to control the movements of tank steamers of a certain class, came into existence. It was sought to deliver the balance of oil in the tank steamer *Hotham Newton*. Then came a specific interference by the Pool Board which took-over the *Hotham Newton* and directed her to carry refined oil instead. The result was that Belfast was very nearly thrown into darkness; and it ultimately managed to get the streets lighted only at very considerable extra cost.

The case for Belfast Corporation was that they had the right to receive oil by the *Hotham Newton* and to a claim for loss resulting from special specific interference with the vessel which had been definitely chartered to deliver the consignment.

Mr. *J. D. Smith*, the Gas Engineer and Manager to the Belfast Corporation, giving evidence, said that the third delivery of oil was made in November, 1917.

Mr. *James Hamilton*, a Director of the Anglo-American Oil Company, said he served on the Pool Board which was appointed by the Board of Trade. He proceeded to explain the several details connected with the sitting of the Board.

Sir JOHN SIMON said that there could be no real dispute regarding the facts. But the question arose as to what the Pool Board was. If it was a private body, then he quite agreed that their intervention in the manner complained of would not justify him in looking to the Crown for compensation. His submission was, however, that it was a Government body; and this being the case, he contended that the Corporation were entitled in principle to succeed. The contractual rights of the Corporation had been totally destroyed by the specific intervention of the Crown.

The SOLICITOR-GENERAL submitted that, upon the facts proved, the case presented by Sir John Simon broke down completely. There was nothing in the agreement between the parties to show that it was the *Hotham Newton* and no other vessel, that was to deliver the balance of oil due to the Corporation. This being the case, there was no claim merely on account of the fact that it was the *Hotham Newton* that had been diverted. Until the oil had been definitely delivered into the tanks of the Belfast Corporation, the liability of delivering the balance remained with the Oil Company. There was no contract to convey it by any particular vessel; and it was as clear as possible that there was no direct interference. So far as the Pool Board was concerned, there was nothing to show that the Government were directly responsible for the actions of that body.

The finding of the Commission will be communicated in due course.

Wakefield Gaslight Company.

At the annual meeting of the stockholders of the Company on Monday of last week, the Chairman (Alderman G. A. Moorhouse, J.P.), in moving the adoption of the report, referred to the abnormal difficulties and the great anxieties experienced during the past year—from labour troubles, inadequate supplies of coal, and large percentage of rubbish contained in what was received. These drawbacks were common to all the gas-works in the country; but their own case was aggravated by the construction of a new sewer, which closed the main entrance to the works and thus greatly deranged the traffic upon which the works depended. Coals cost £9899 more than the previous year. There was an increase in the amount of gas sold of 6·81 p.ct. Residuals had turned out well, yielding £7714 more than last year. The balance to the credit of the revenue account was £8087, as compared with £7629 last year. The 10s. rebate granted by the Government on all coal used for making gas for domestic or household purposes would be passed on to the domestic consumers as a rebate from the March quarterly accounts, and would also be allowed to the slot consumers. Final dividends of 1½ p.ct. on the ordinary stock, (making 3¾ p.ct. for the full year—all which could be paid under the Temporary Increase of Charges Act, 1918—as compared with 6½ p.ct. before the war), and of 2½ p.ct. on the maximum stock, making 5 p.ct. for the year, were approved. An extraordinary meeting followed, at which the Directors were authorized to issue the sum of £30,000 mortgages in such amounts, at such times, and upon such conditions as they may determine.

Gas Supply of Thornaby-on-Tees.—In moving the appointment of a Committee to consider the position of the gas supply, Mr. Oxberry, at a meeting of the Thornaby-on-Tees Corporation last Tuesday, said the price of the gas supplied to them by the Stockton Corporation was 4s. 4d. per 1000 c.ft., less 10 p.ct., which was three times as much as at Sunderland, practically double that of both Middlesbrough and Darlington, and 1s. 10d. more than at Newcastle and Gateshead. A Committee was appointed.

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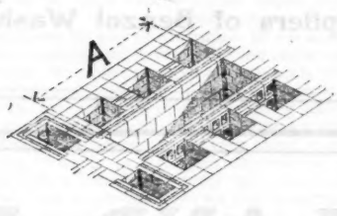

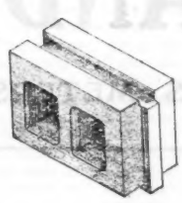

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MISCELLANEOUS NEWS.

SOUTH METROPOLITAN GAS COMPANY.

The Ordinary Half-Yearly General Meeting of the Proprietors was held at the Cannon Street Hotel last Wednesday—Dr. CHARLES CARPENTER in the chair.

The SECRETARY (Mr. F. M'Leod) read the advertisement convening the meeting, and the minutes of the last ordinary general meeting and extraordinary general meeting. The seal of the Company was affixed to the "Register of Proprietors."

THE CHAIRMAN'S SPEECH.

Ladies and Gentlemen,—I assume that, following your usual practice, you will take as read the report and accounts which have been printed and circulated among you; and I have now to move their adoption. You will observe that we have earned somewhat more than sufficient to make both ends meet; but the surplus is a small one compared with the magnitude of the figures involved. It must not be forgotten, when considering the result of the half-year's working, that this surplus is merely due to the fact that provision is only allowed by the Statutory Undertakings (Increase of Charges) Act, 1918, for payment of a dividend of little over one-half of the pre-war rate. If we were allowed to pay our pre-war dividend, modest though it was, and inadequate as it would be considered to-day, we should have been faced with a substantial deficit. And this would have arisen in conjunction with what must otherwise have been described as a flourishing business, the sales and turnover from which are both extending. While the war was in progress, we were of opinion that little could be expected in the way of alleviating this paradoxical state of things; but now that hostilities have ceased, it is only the barest justice that it should be remedied. I will deal fully with our proposals in this respect when I explain at the following Wharncliffe meeting the provisions of our new Bill. Now, I need only say that our shareholders are suffering from a great hardship, which it is the clear business of the State to allow us to remove. [Applause.]

THE INCREASED COST OF LABOUR.

The next paragraph of the report crystallizes in a few words one of the great difficulties under which we are carrying on our business. Our labour bill has increased by £1,000,000 per annum compared with pre-war; and by this I do not mean that increased labour costs are indicated by that figure alone. It represents what we ourselves are paying directly to our employees by way of increase. If we were to include the increased labour charges paid indirectly in the higher costs of raw and finished materials, the figure would be very much greater—probably between £500,000 and £750,000. So that in the matter of labour alone, we are taking from the consumers something like £1,500,000 to £1,750,000 a year more than we did in the pre-war times. Now, such figures as these must necessitate a very close scrutiny of our methods of working, in order to test their efficiency by present-day costs. We started with a heavier handicap than many undertakings, by reason of the fact that in pre-war days we had no occasion to go in extensively for labour-saving devices. We were on good terms with our employees, and had no need of a labour-saving device as distinct from a cost-saving one. The responsibility for this policy is shared by you, ladies and gentlemen, for it has more than once been announced to you at these meetings. The problem to-day, however, has become a very different one. We cannot carry on unless we have in all our operations the most complete system of minimizing manual labour—of which, by the way, some talk as though it were the only form of labour to have any consideration. We shall have to examine anew all our methods and processes, since we have now got to look at these from a totally different view-point from that of pre-war days. Fortunately, we are greatly stimulated in such efforts by the attitude of our employees, who not only welcome all endeavours to increase efficiency, but are helping us in every way to achieve it. I think this is a most satisfactory statement for me to make this afternoon. It is a condition of things which must eventually be of great help to us in our struggle to free ourselves from the maelstrom of high prices. But at the most these economies are, I fear, very far from balancing increased labour costs; and I have no justification for hoping that they will eventually do so to anything like a corresponding degree.

THE ELIMINATION OF CARBON BISULPHIDE.

The report then refers to our endeavour to maintain a high standard of purity in our gas. You may remember that, at the February meeting in 1914, I was able to announce to you that we had solved a problem which had baffled the efforts of technicians and scientists for the greater part of the last century—namely, the purification of coal gas from carbon bisulphide. Then the war came, and we were without means either to extend or complete the plants we had erected for this purpose. Since the armistice, we have again begun to move forward. We are getting our apparatus into working order, and are evolving an even simpler form, which will enable the process to be extended at a lower capital cost. Even during war-time we have given thought to what is, in our opinion, an all-important matter to us, though, of course, during the war we were unable to do anything. But to-day we—and when I say we, I mean, not only your Board of Directors, but your commercial and technical staff as well—are more strongly of opinion than ever that the elimination of the carbon bisulphide content of gas is essential to the satisfactory progress of our business. We say that wherever a wax candle can be used for providing light, a gas-flame should be found equally suitable, without any disability arising from any difference in its products of combustion; and we believe that this will not only maintain the present uses of gas, but will go further and give a great impetus to their extension. I do not know that I need say that these proposals are not very popular generally among gas undertakings; but then you must also remember that undertakings of this kind are naturally of conservative characteristics. The industry, it will be borne in mind, has been established well over a century; and it suffers from some of the disabilities of this long life. However, the industry has made one very forward step. It has accepted what is called the heat basis as a method of charging for gas; and I have the conviction that it will one day adopt the highest attainable standard of purity also.

INCREASED SALES OF GAS.

The substantial increase in the sales of gas during the half year is gratifying, though it would be easy to attach too much importance to it. The delivery of solid fuel has been restricted and irregular; while, on the other hand, the supply of gaseous fuel is everywhere available throughout our district in unlimited quantity at any hour of the day or night, Sundays or week days. Moreover, the control over the flow of gas by simply turning on or off a tap provides a facility of economical use unattained with similar ease by any other form of distributed energy. It seems probable, too, that with dearer coal the householder is relying more upon gaseous fuel than he ever did in the past, and that on the all-important score of economy. In this connection, I would like to express the hope that as many of you as possible who have not done so will endeavour to visit the Ideal Home Exhibition at Olympia. You will there, I think, see ample justification for our contention that the supply of light and heat is no longer a monopoly either on the part of the gas or the electric undertakings. Both are in keen competition to the advantage of the public they supply; and a sliding-scale stimulus is no longer necessary to ensure economy in their working. At the same time, I feel you will come away, after visiting our exhibit, with the conclusion that gaseous energy has at least as great a claim as electric energy to be counted the "handmaid of the people."

THE EMPLOYEES' SHARE IN THE MANAGEMENT.

The report completes its story of the half-year's operations of the Company by a reference to the Bill now being promoted by us, and the proposed modification of the scheme by which a share in the management is given to the employees. I will now only deal with the last-mentioned matter, reserving my remarks in connection with the Bill for their proper place—namely, the extraordinary meeting. During the past four or five years, there have been various criticisms of the policy of the Board—mainly, I think, inspired by the feeling of unjust suffering on the part of the shareholders at the low rate of interest. But this criticism was mild compared with what my predecessor faced when he submitted his project for adding the keystone to our co-partnership edifice by the admission of the Company's employees to direct representation upon the Board of management. The experiment, if it can still be so described, has now been running for 21 years, and has completely falsified the pessimistic prophecy of those who foretold it would presage the downfall of the Company. The principle has been an unqualified success. The details of the scheme have shown defects which we have sought to correct, and to which, in their revised form, I shall ask you presently to give your sanction. The variations are very simple, and do not affect the principles one iota. Under the existing scheme, each of the three largest stations of the Company is entitled to select one candidate; and the smaller stations of the Company are grouped together for the purpose of selecting another. There is also a provision that not more than one candidate can be put forward from any station. The new proposals sweep away these artificial regulations, which were considered important when the scheme was devised, and throws open the selection of all candidates by the voters irrespective of the stations at which they are employed; while all the candidates may be drawn from any one of them. The method of election—which I may remind you is by ballot, and the votes proportional to the share interest—is also appropriately modified; and the remuneration of each employee-Director is raised to a basic figure of £2 5s. per attendance, which is more in accordance with present-day values. The other changes are merely of a drafting nature, and consequential upon the alterations which I have described. I have been asked whether the employees desire or appreciate representation of the kind to which I have been referring. I can emphatically say that they do; and I think very good evidence of this is afforded by the proposals for revision, which they, in the first place, put forward, and which have for their object the obtaining of the best possible persons to represent them on the Board.

THE COMPANY'S PROUD RECORD.

Before I sit down I should like officially to put on record one fact of which I am sure as shareholders you will be very proud. It is this—that of our total staff, officers and employees, no less than one-half have served their country in either the navy or the army. [Applause.] I might also add that a souvenir of their war service has been prepared, under the direction of the Co-Parnership Committee; and the Secretary will be very pleased to post a copy to any shareholder who desires one.

I move—

"That the report and accounts now presented be received and adopted, and the report entered on the minutes.

The DEPUTY-CHAIRMAN (Mr. Frank H. Jones): We have a lot of business to get through this afternoon; and I will do no more than formally second the motion. I should, however, like to emphasize the importance of the Employee Director question; and when this proposed alteration of the scheme comes forward, I am sure you will all agree with it.

The motion was put to the meeting, and carried unanimously.

THE DIVIDEND.

The CHAIRMAN: I have now to move—

"That dividends as follows for the half year ended Dec. 31 last be now declared—viz., on the 5 p.ct. redeemable preference stock at the rate of 5 p.ct. per annum; on the ordinary stock at the rate of 3 p.ct. per annum; and that the warrants be transmitted to the registered addresses of the proprietors by post."

Mr. A. M. PADDON seconded the resolution; and it was agreed to.

EMPLOYEE DIRECTORS.

The CHAIRMAN: I have next to move—

"That the proposals passed by the Board of Directors at their meeting on the 4th inst. for varying the scheme for the election of

Employees' Directors adopted by the shareholders on Aug. 14, 1907, be approved and adopted, subject to such alterations as the Board of Trade may suggest and the Directors agree to."

I have already explained shortly what these alterations are; and I do not think I need go further into the matter.

Mr. H. T. MANLEY, an Employees' Director, seconded the resolution; and it was passed unanimously.

DIRECTORS AND AUDITOR RE-APPOINTED.

Mr. K. P. Hawksley was re-elected a Director, on the proposition of the CHAIRMAN, seconded by the DEPUTY-CHAIRMAN; and Mr. Frank H. Jones was re-appointed, on the motion of the CHAIRMAN, seconded by Mr. JOHN MEWS.

Proposed by Mr. PASMORE, and seconded by Mr. YOUNGS, Mr. Charles P. Crookenden was re-appointed an Auditor of the Company.

The CHAIRMAN: That concludes the business of the ordinary meeting.

AN EXTRAORDINARY MEETING.

THE COMPANY'S BILL APPROVED.

The CHAIRMAN: We have now become an extraordinary or Wharncliffe meeting; and I will ask the Secretary to read the notice.

The SECRETARY thereupon read the notice convening the meeting.

The CHAIRMAN: I must preface my explanation of the Bill we have deposited by a few general observations. Our charter of working is, like that of most other similar undertakings, based on what is known as the sliding-scale, which was advocated by my predecessor in the chair in 1875, and was adopted by this Company the following year. The object of the promoters of the sliding-scale—I quote from a report of the proceedings of the Committee of Parliament who initiated it—was to provide a stimulus which at that time did not exist whereby gas companies would be encouraged to carry out their operations with the same kind of good management as was customary with ordinary businesses, while at the same time they would be fined for bad management by having their dividend reduced. The basic principle was reward to the undertaking for good management; fine or penalty on the undertaking for bad management. In this manner the interests of the Company and consumers were associated to their mutual advantage. Upon two occasions since 1876 the scale has been modified, but without disturbing the underlying principle upon which it was established. Matters went on until the stress of war broke-down the sliding-scale regulations, as you know only too well. But I am bound to say that for some two or three years before that I strongly felt that justice was not being done to the shareholders in return for the skill and enterprise which were animating the conduct of their business. I must also add that I never felt that war-time was a good opportunity for obtaining sympathetic consideration of our undoubted grievences. I think I am supported in that view by the meagreness of the relief which was afforded by the Statutory Undertakings (Temporary Increase of Charges) Act, 1918. However, the war is over. We have now entered upon what is euphemistically called "the period of reconstruction;" and just as no one to-day doubts the essential part played by the gas industry in present-day civilization, and which was brought home to everyone very clearly during the war, so I imagine no one—or at least no fair-minded person—will suggest that in the reconstruction which is going on the claims of those who have furnished the money to build-up and extend the important business of gas supply should be disregarded.

DEFECTS OF THE SLIDING-SCALE REVEALED.

In the task of formulating our proposals for the betterment of our position, two courses were open to us. On the one hand we might have attempted to reconstitute the sliding-scale provisions and endeavour to make them fit present and possible conditions. On the other hand, we might regard the problem with the enlightenment which war has brought about and, unhampered by adherence to the past, devise a new basis of regulation in accordance with the spirit of the times. We have chosen the latter course. Now to-day two fatal defects of the sliding-scale have revealed themselves. In the first place, it only took into account a consideration of the interests of two parties—namely, the shareholder and the consumer. This defect was, it is true, pointed out to Livesey; but, while admitting it, as he did, fully and frankly, it was not until some years afterwards that he was able to take steps to remedy this admitted defect. In 1889, he put forward the first of his proposals, the object of which was to acknowledge the right of labour—I use the word in its generally accepted sense—to have its place recognized in industry otherwise than as a wage-earner. I need not trouble you to-day with the details of the progress towards the achievement of Livesey's ideals. You, ladies and gentlemen, in conjunction with the gas consumers of South London, have for many years past been enjoying the benefits attaching to their accomplishment. But, like the sliding-scale, the practice of them, in one important particular, broke down under war conditions. Though the shareholders' dividend, despite rising prices and taxation, has fallen to 2½ p.ct. per annum on the capital moneys invested, the co-partnership bonus of the employees has vanished altogether. Labour has had its standard wages, rising from time to time, as conditions of living changed. Capital has not only not received a standard wage, but its remuneration is considerably below it. Now our co-partnership principles are not statutory, except in relation to the matter we dealt with a few minutes ago—namely, the election of the Employees' Directors to the Board. Our new proposals will make our co-partnership principles statutory ones. Secondly, the object of the sliding-scale was to reduce our dividend in the event of bad management. No one can accuse us of that; for I do not think there is a consumer in South London who would deny that we have managed our business in his best interests. [Applause.] But, all the same, the sliding-scale has fined us by a large reduction of dividend, just as though we were guilty of bad management. Moreover, it would not offer, if restored, the inducement of a reward commensurate with the changed conditions now obtaining in the country. We want to correct this defect also; for the future position of our industry and of our raw material is far more uncertain than in the monopoly days for which the sliding-scale was created. New investors will certainly not be encouraged if the spirit of fairness is absent in adjusting the hardships of the old investors.

BASIC PRINCIPLES FOR INDUSTRY.

We affirm at the outset of our proposals that the principles upon which industry should be based are: Fair remuneration for the use of capital. Fair (or standard) wages for employees. A fair price payable by the consumer for the commodity supplied. These are three basic principles to which no one, whatever class he may represent—whether capitalist, employee, or consumer—can object. But these alone would not be sufficient. Compliance with these three conditions would not in themselves provide the stimulus to good management to which I have referred and which the promoters of the sliding-scale wisely considered an essential. What is wanting? What is wanting is the stimulus of profit-making, which, despite all socialistic ideals, has a basic relationship to progress. ["Hear, hear."] How can we carry this out, and at the same time fulfil the indispensable condition of completely safeguarding the interests of the consumer? The Bill provides a full answer to this question; and I will now proceed to explain its provisions.

THE PROVISIONS OF THE BILL.

Perhaps I ought in the first place to give the title of the Bill. It is a Bill to enable the South Metropolitan Gas Company to sell gas on a heat unit basis; to make new provision as to charges for the gas and application of the profits of the Company; to extend the powers of the Company to amalgamate with or purchase other undertakings; and for other purposes. The first part of the Bill recites the conditions under which we work; what has happened to the sliding-scale during the war; and the necessity for the tripartite interest to which I have drawn your attention. It also refers to another important point which I think I had better read in the words of the Bill. It recites that the Company are desirous that, with a view to securing the objects aimed at, "provision should be made whereby the profits of the undertaking, after providing for a reasonable return on capital, should be applied as to the greater part thereof in reduction of the price of gas, and as to the balance thereof in part in increasing returns on capital invested in the undertaking, and in other part by way of bonus to employee co-partners of the Company." This is to say that the larger part of the increased profits are to be applied to reducing the price of gas. Then we also recite the disadvantages of the present system, whereby the charge for gas has no reference to its heating value. We say it is expedient that new provisions should be set forth. Then the recital refers to the fact that, in the Company's Act of 1876, there was a stipulation with regard to our amalgamation with the South Suburban Gas Company—at that time the Crystal Palace District Gas Company. In other words, we were barred from any amalgamation with that undertaking. This had been in one sense of the word removed, because the proviso was repealed by a clause in one of the Crystal Palace Company's Acts; but it was still unrepealed as regards our own Company, and we thought it better to ask for the repeal of our clause, because if we ever do decide to talk over the amalgamation of these two undertakings we should then meet on a perfectly level and fair footing. Then we come to the clauses. The first definition is that of a British thermal unit. I have defined this on previous occasions; and I do not think I need worry you with it to-day, except to remind you that the British thermal unit is the amount of heat that will raise 1 lb. of water 1° Fahr. in temperature. It next defines that the calorific value of the gas means the gross number of British thermal units contained in 1 c.ft. The next definition is that the expression standard unit used later on in the Act means the standard unit of calorific value prescribed by the Act. I think that is all I need say with regard to definitions.

The next portion of the Bill deals with the new conditions that our supply of gas is proposed to be hereafter—after the passing of the Act—on the basis of its heat-content, rather than its light-content. We say that the heat unit shall be 100,000 British thermal units; and within six months of the passing of the Act we shall have to declare what our calorific value is to be. The next clause explains how we arrive at the number of standard units—namely, by multiplying the number of British thermal units comprised in the declared calorific value of the gas by the number of cubic feet supplied. Then we are required to give notice in writing to the Board of Trade, the London County Council, and the local authorities that we are going to supply gas of a certain calorific value; and the clause gives us power to vary this calorific power, always subject to notice. The object of this is that we are not in a position—and shall not be for a long time—to say what is the most economical and best calorific value to supply. The object of the new proposals is that we may supply heat units as economically as possible; but whether they shall be in the form of gas of 600 B.Th.U., or 500 B.Th.U., or any other figure, we cannot say, so we take power in the Bill to supply whatever is best—always provided that the consumer is to be charged for exactly what he gets. Before we make a change of this kind, the obligation will be placed upon us of seeing that the consumers' appliances are of such a character that they will be able to get the best value from the gas we are going to supply. That is a most essential thing. It is important from the point of view of supplying heat units that we should have latitude in the form in which we supply them. It is no less important that the consumers' appliances should be equally ready and able to receive them. Therefore we suggest this obligation to make any necessary adjustments.

The next clause is a very important one, and it is one of the greatest protections that the consumer can have with regard to what he will get under these new conditions. Testing has been more or less suspended during the war; but before the war the consumers' protection was that there were in the district of supply a certain number of testing stations; and there the tester used to attend at intervals during the day and make an estimation of the illuminating power of the gas by means of a photometer. So that you see the protection which the consumer had in respect of illuminating power depended upon these periodic irregular visits paid by the tester. The new proposals require that the heating value of the gas shall be continuously measured and recorded by a recording instrument. This means that at these various testing-stations there will be an automatic instrument

which, hour by hour throughout the twenty-four, will go on recording what is actually and certainly the calorific value of the gas which we are supplying. So that the consumer under these conditions will have a guarantee of quality such as he has never had before in the history of gas supply.

One other obligation follows in regard to pressure. It is quite an insignificant one; but I mention it. It is that after four years from the passing of the Act, service-pipes of 2 in. and upwards shall be provided with gas at 20-10ths pressure. For the sake of other undertakings, I will not enlarge upon this particular point.

The next clause limits us in respect of inert constituents. I was asked at one meeting, What are inert constituents? An inert constituent of coal gas is a gas which is neither combustible nor supports combustion. Now we shall be in future limited, during a period of two years from the passing of the Act to a maximum of 20 p.ct., for the following two years 18 p.ct., and after that 15 p.ct. This is quite an easy obligation; and expressed in the language of the street, I think we shall be able to "do it on our head." But it is very necessary, because if a gas is laden with a considerable percentage of inert matter it means that larger mains, larger services, larger meters, and larger apparatus have got to be provided in order to ensure its use. So that it is in everybody's interest—unfortunately, many of the conservative gas undertakings I have mentioned cannot see it, but it is to everybody's interest to reduce the inerts to the least possible degree. We propose in the Bill to fix a limit which is in accordance with the recommendations of the Committee of the Fuel Board of the Privy Council Department for Research, which was formed under the chairmanship of Sir George Beilby.

In the Bill it is provided that we shall be penalized, not only if the gas is lower than the standard, but also if it is above it. Perhaps it may seem curious that we should be penalized for supplying gas of a higher quality than we engaged to do; but the whole point is that the consumer will not be getting the best results by our doing so. Therefore we place upon ourselves the obligation, under penalties, to supply a gas as nearly on a level line as possible. Then there is a penalty for the inert constituents; and the next clause is drawn with the idea of incorporating the whole of the present testing provisions with the Act, and making them interchangeable.

Well, now, we come to the all-important part—the price of gas and the dividend. We set out in the first clause that the basic price for gas supplied under the powers of the Act shall be 11d. for each standard unit; and that is referred to as the basic price. I told you we had got to have three factors—fair wages, a fair return on capital, and a fair price to the consumer for his gas. This last we have fixed at 11d. per unit, and call it the basic price. The Company may increase or reduce the price charged above or below that; but they must not pay, except as by the Act otherwise provided, in any one year a dividend on the ordinary stock of more than 6 p.ct. This 6 p.ct. is described as the authorized rate. Now I come to what I think I may call the kernel of the Bill, which provides the machinery for the protection of the consumer. I must read this; and I will then explain it:

> "Whereas it is expedient that the surplus profits of the Company should in the future be divided in the following proportions—namely, three-fourths to the consumers and one-fourth equally between the ordinary stockholders and the employee co-partners of the Company, the following provisions shall apply (that is to say): At the end of each year or half year a sum shall be calculate representing the amount by which the total amount payable by consumers during such year or half year has been less than the amount which would have been payable if the gas had been charged for at the basic price."

Supposing the basic rate is 11d., and in that half year the consumer had been charged 10½d. instead, and supposing ½d. on the gas supply during this period amounts to £50,000, that would be the sum referred to in this clause. We go on:

> "And such sum so calculated shall be called 'the consumers' share;' and for the purposes of this section 'the surplus profits' shall mean a sum of which the consumers' share is three-quarters."

Now that settles the consumers' side of it. It ensures that of the surplus profits he is going to get three-quarters by way of reduction in the price of gas. Now we have to deal with the appropriation of the remainder:

> "If, and so far as, the balance standing to the credit of the net revenue account after providing for dividend on the preference stock and dividend at the authorized rate on the ordinary stock in the opinion of the Directors permits, a sum not exceeding one-quarter of the surplus profits shall be applied in two equal parts for the benefit of the holders of ordinary stock, and for the benefit of the employee co-partners of the Company."

Then we say that any sum so to be applied for the benefit of the holders of ordinary stock may be applied to the payment of dividends or the building-up of the reserve fund. We also provide for the allocation of the co-partners' share, and say that the trustees of this share are to be the Employee Directors. Any balance not applied as aforesaid shall be carried to the credit of the next half-year's or year's working, as the case may be. But, in order to prevent us piling-up the amount, a proviso is added that the sum standing to the credit of such net revenue account shall not at any time exceed the amount required to pay one year's dividend on the preference stock and one year's dividend on the ordinary stock.

The next clause refers to the question of purity; and it provides that, if the Chief Gas Examiner shall certify that we have attained a certain degree of purity—a very high degree—we shall be entitled (that is to say, the shareholders and the employees shall be entitled) to such extra allowance as would be represented by the allocation of surplus profit at the rate of ¼d. per unit. What we say is that if we spend the money in providing gas of a higher purity rather than in reducing the price of gas—or to put it in another way: Suppose we spend, speaking in present-day language, 1d. per 1000 c.ft. in increasing the purity of the gas, everybody will agree that if we achieve the standard we have set out to reach, it would be better for the consumer to spend the money in that way than that it should be spent in the price of gas. Or, in other words, that this money would be better applied in improving the quality of the gas rather than in reduction of its price. We say, if that is so, we ought to have just the same consideration as if every penny had been applied to a reduction in price.

Then we provide that the rent of prepayment meters should be on a fixed basis. We substitute for the present charge a charge of 1⅜d. for each standard unit. The present legal maximum is 10d. per 1000 c.ft.; and altering the phraseology to speak of price per unit, the figure suggested is 9·8d. This compared with the 10d. is slightly in favour of the consumer, but a great convenience to us from the point of view of making-up accounts. We propose to show, as now, on each receipt the particulars of the charge.

The next clause gives us power to pay interim dividends, in case we decide to meet yearly instead of half yearly. Then we refer to the closing of the transfer-books previous to declaring interim dividends. After that we deal with the reserve and special purposes funds. We are, as you know, in the possession of a reserve fund somewhat depleted; but it has been made up wholly and absolutely by setting on one side from time to time moneys which would otherwise have been taken in the form of dividend. Dividend has been sacrificed in order to put the money in the reserve fund and build-up such a fund for future necessities. We have been tied-down as to the manner in which this fund should be dealt with. It is absolutely your money; and it seems unfair that we should be hampered, and not able to make the best use of it. The object of the clause is to remove this disability, and allow us to use your money (as in common fairness we should) in any way that you may authorize us to do. Then we have in addition the insurance fund, which is provided to enable us to do certain things which may arise in the course of our operations. But the difficulty of the insurance fund is that it does not provide us with the elastic medium which is necessary in our business; and for this reason Parliament years ago gave authority to undertakings to provide what is called a special purposes fund. This fund is formed by setting aside up to 1 p.ct. per annum on the paid-up capital; and the money so accumulated can be applied (with the approval of the Board of Trade Auditor) to meeting certain exceptional expenses incurred.

Another part of the Bill deals with Directors, and the method of filling-up an occasional vacancy. The present plan is a very crude one; and we desire to bring ourselves into line with the provisions included in practically every Act to-day. Supposing, for one reason or another, we should lose a Director, this clause will give the Board the power to fill up the vacancy until the next meeting, when the shareholders can either support the proposal of the Board or reject it, as the case may be. It obviates the cumbrous procedure of our having to call a meeting of shareholders together specially for the purpose of filling a vacancy on the Board. The other point refers to Directors holding office under or contracting with the Company. There we put in the usual clause, which is common in all undertakings to-day. It is less drastic than the clause in the Companies' Clauses Consolidation Act of 1845. Let me give you an instance. I sit upon the Board of another gas company who sometimes buy from this Company and sometimes sell to us. I am not quite certain whether someone might not some day say that this is an improper position for me to hold. It is quite a fair position; but I am not sure that under the old Act one might not say I ought not to occupy a position of this kind. Perhaps, as it refers to all the Directors, I ought to read the whole clause:

> Notwithstanding anything in the Companies Clauses Consolidation Act, 1845, no person shall be disqualified from being a Director of the Company by reason of his holding any office or place of trust or profit under the Company, or by reason of his being interested in any contract with the Company, nor shall any Director be required to cease from voting or acting as a Director by reason of his accepting any such office or place of trust or profit or becoming interested in any such contract: Provided that, in the case of his being or becoming interested in any contract with the Company, whether such interest shall arise before or after his appointment as a Director, the nature of his interest in the contract shall be disclosed by him at the meeting of the Directors at which the contract is determined on, if his interest then exists, or in any other case at the first meeting of the Directors after the acquisition of his interest or after his appointment; and that no Director shall, as a Directer, vote in respect of any such contract; and if he does so vote his vote shall not be counted. But this prohibition shall not apply to any contract by or on behalf of the Company to give to the Directors or any of them any security by way of indemnity.

The final clauses are miscellaneous. We take power to supply gas in bulk. We already have power to supply it in bulk to a neighbouring company; but not to a local authority. It might be necessary to have this power. It is requisite from time to time to take power to acquire lands; and a clause gives us authority to buy up to 50 acres for the purposes of the undertaking, provided that we shall not create or permit a nuisance upon the land. I have no doubt we shall have to give an undertaking that we will not erect gas-works upon it. The next clause refers to meetings. The object is to follow the procedure which is common now, and hold these meetings yearly instead of half yearly. The Directors also take power to grant pensions or retiring allowances to the officers and employees. It seems rather curious that we should ask for this, as we have been granting pensions and allowances for a good many years. We have been doing this under general powers; but we are now taking specific authority. Clause 33 reads:

> "The provisions of section 64 of the Act of 1876 shall be read and construed as if the same empowered the Company, but subject to the provisions of that section, to amalgamate their undertaking with or to purchase any undertaking for the supply of gas in any limits of supply which adjoin or are contiguous to those of the Company."

The remaining sections merely deal with variations in existing Acts. I hope, at some length, I have made the proposals of the Bill clear; but if not I shall be only too pleased to give you any further information. [Applause.] I beg to move—

That the Bill now submitted to this meeting, intituled "A Bill to enable the South Metropolitan Gas Company to sell gas on a

heat unit basis; to make new provision as to charges for the gas and application of the profits of the Company; to extend the powers of the Company to amalgamate with or purchase other undertakings; and for other purposes," be and the same is hereby approved, subject to such additions, alterations, and variations as Parliament may think fit to make therein.

The DEPUTY-CHAIRMAN: I second the motion, and cannot think you wish to hear from me anything more about this Bill.

STOCKHOLDERS' REMARKS.

Mr. E. T. NALTY: I have listened with very great interest, Sir, to your outline of the new Bill, which must have required a very considerable amount of trouble and thought to compile. Naturally, I have not been able to master the whole of it by any means; but as regards those points which protect the public, I am quite sure the Government, or the authorities who look after Bills, will see that the consumer is adequately protected. As to the stockholders, the one thing that interests us perhaps before all others is the matter of dividend. It is by our dividends that a very large number of us live. I know that in this Company there are great numbers of people who, by labour followed by thrift, or coupled with thrift, have saved their money and put it into this undertaking, with the assurance at the time that their income was practically assured for round about a certain sum per annum. Now, of course, it is always the unforeseen that happens, and certainly many of us did not anticipate this terrible war from which we have all suffered. The shareholders of the Company, I think, have suffered as severely as, perhaps more than, those in any other undertakings. The period of time now seems to be divided into two spaces—that is, before the war and after the war. Before the war, 1s. in a man's pocket had practically speaking the same purchasing power as 2s. 6d. to-day. The Government have very ably seconded the rights of labour to a living wage. Now the attention of the Government, I venture to suggest, must be drawn also to the fact that shareholders in such a public utility undertaking as this have a right to live. ["Hear, hear."] I was highly interested in the three basic principles of business which you brought before the meeting. These three principles were put before me by one of my first employers. It was an ordinary commercial undertaking, and my employer said: "There are three things to bear in mind. First, we must satisfy our customers; secondly, we must satisfy our employees; and, thirdly, we must satisfy ourselves. If the third thing does not happen, well good-bye to the other two."

Mr. D. T. POWELL: It seems to me it will be desirable to know who is to be arbiter of what is a fair remuneration for capital, fair wages to labour, and fair prices to the consumer. Later on, Sir, you referred to a reasonable return on capital. What is the difference between "fair" and "reasonable"? Then you said we had power to amalgamate. Does this also carry power to sell the whole undertaking? You referred to consumers' fittings, and altering them and bringing them up to date; but you did not tell us at whose expense. With regard to the maximum dividend, I understood you to say it would be 6 p.ct. Is that so? If not, what is actually the utmost dividend the shareholders may expect? Is there a limit on the interest paid on borrowed capital? Will it be possible for Directors to pay more to outside lenders of money than they pay to their own shareholders, who stand a fluctuating chance of profit?

The CHAIRMAN: Answering your last question first, I may say that if the proprietors will be our bankers, we shall be very pleased to borrow from them instead of from the bank, but at present we have to depend very heavily on the bank. As soon as things get a little bit settled, I hope we shall take steps to exchange our obligation to the bankers for an obligation in respect to preference or ordinary stockholders, as the case may be; but we have to provide for a business which is increasingly expensive by reason of the high cost of raw material. I think it is best to try and look upon this as more or less of a temporary character, and to rely upon the help of our bankers to provide what is needful. With regard to "fair" and "reasonable," I do not know that there is very much difference between the two; but it is, as has been said before this afternoon, a basic principle, and whether you speak of it as a fair dividend or as a reasonable one, it means practically the same thing in the long run. The Bill does not propose to limit the dividend, because if it did that it would limit enterprise. I think the war has taught the country a fact which few knew before—that you must have the incentive of profit making in order to progress at all in industry. We speak in the Bill of the authorized dividend, which we say should be 6 p.ct. We look upon this as a fair and reasonable amount; and in that view we have the support of the highest financial authorities in London. That alone will not ensure undertakings of this kind, or any other, being managed with the utmost efficiency and the greatest economy. There would be no incentive; and that is where profit comes in. Our idea is that profit should come in after all the conditions I have laid down have been complied with. One point was, What are fair wages for employees? The wages are fixed more or less by the district or by the custom of the trade implicated; and they are just as clear as setting out what interest should be paid on capital. No undertaking has any right to exist to-day unless it is in a position to pay what are called the standard wages. That has been accepted by us for many years past, and is implied by the proposals placed before you this afternoon. As to the adaptation of consumers' fittings for the new conditions, this will be done under the Bill at the expense of the Company. With regard to the suggestions made by the previous speaker, it is perfectly true that the shareholders in the Company have experienced during the five years of war more than anybody else the hardships resulting from the sliding-scale; and the reason is that, owing to the happy relationship of the Company with their employees for the last thirty years, many people have acquired an interest in the undertaking by the purchase of stock who would not have otherwise have done so. I cannot reveal the circumstances of our register; but I can say there are as shareholders public people who I cannot imagine would have run the risk had they not been conscious of the fact that the principles under which we have carried on our business—particularly for the last thirty years—have been beyond reproach. The result of all this was that higher prices were paid for this Company's stock than was the case probably in any other similar undertaking. So it is perfectly true, as the speaker said, that shareholders in this Company have on the whole been hit more heavily than any others. With much that he has stated we are quite in sympathy; and we have endeavoured to put forward a scheme in which nobody can pick holes. It is one which, to the best of our belief, is fair and honest, and will stand-up to the criticism which is sure to be aimed at it by public authorities and others. That, and that only, can be the basis of proposals put forward by an undertaking of this kind.

The resolution was then put and carried unanimously.

The CHAIRMAN: That concludes the business of the meeting.

COMMERCIAL GAS COMPANY.

The Annual Meeting of the Company was held last Thursday, at the Cannon Street Hotel, E.C.—Mr. W. G. BRADSHAW in the chair.

The SECRETARY (Mr. F. J. Bradfield) read the notice convening the meeting; and afterwards the report of the Directors and the statement of accounts were taken as read.

A LOSS TO THE BOARD AND A NEW DIRECTOR.

The CHAIRMAN, moving the adoption of the report and accounts, said: Gentlemen,—I am sorry to have to preface the remarks which I have to make in explanation of the report and accounts now before you with an expression of deep regret at the death which took place last year, owing to an accident, of our colleague, Sir Thomas Fowell Victor Buxton. Sir Victor Buxton bore a name which has been honourable for more than a century in the annals of the country for the philanthropic work accomplished by successive members of the family. It has also been known for successful business enterprise in East London. Sir Victor Buxton in both respects was a worthy scion of his house. He had not long been a member of our Board; but he had rapidly acquired a knowledge of the business of the Company, and bade fair to be a valuable Director. He never spared himself where the interest of the Company was concerned; and we shall miss his wise counsel and his cheerful readiness to undertake any duty which fell to his share. In accordance with the Acts of Parliament which regulate the Company, we have elected the Right Hon. Sir Horace Brooks Marshall, K.C.V.O., to fill the vacancy. His recent brilliant and successful term of office as Lord Mayor of London is fresh in our minds; and I need not say anything as to his fitness to be a Director of the Company. The fact that he is the head of a very large and prosperous concern, and the success which has attended his business career, are sufficient evidence of this. We congratulate him upon the honours which have been conferred upon him recently by H.M. the King, and the appreciation which his fellow-citizens have shown of his work as Lord Mayor of London in Peace Year.

SOUND CONDITIONS, BUT ADDITIONAL BURDENS.

For the first time we present you accounts which comprise a full year's work. I think, when I come to go through the figures with you, you will agree that a year's accounts afford a safer guide to the progress and position of the Company than any shorter period. The accounts will show you that the Company has continued its career of prosperity and success. I can add to that the statement that our customers are satisfied with the gas supplied them and with the price charged for it; while our workpeople have given many proofs of their attachment to the Company, and their appreciation of the advantages they derive from service with it. The fact that we have been supplying gas at 1s. per 1000 c.ft. less than the other two Metropolitan Companies is a source of much gratification to us; and we believe it has been of great benefit to the inhabitants of our industrial district. It has been our policy through the war to lessen the strain and stress of financial burden (which bore heavily upon us all) so far as we could for our consumers. We have kept our works in sufficient repair, and in good condition; but we have been unable, owing to the high prices of material, and the impossibility of obtaining sufficient labour, to carry out extensions and improvements which we should otherwise have undertaken. We have to look forward now to a good deal of work to bring our coal carbonization plant up to the requirements of the Company, more especially as the increase in the price of oil renders the use of carburetted water gas almost prohibitive. It will pay the Company to improve the productive power of its coal-producing plant even at the present high cost of construction. We have been supplying gas at 3s. 8d. per 1000 c.ft. throughout the whole of the year under review. For the first half of the year we were more than able to make both ends meet, and to show a satisfactory profit. But in July last the Government increased the price of coal by 6s. a ton; and consequently the second half of the year produced a much smaller balance of profit. Quite recently, the Industrial Court awarded another 5s. per week to all adult employees in the gas industry. These two causes will result in considerable increases in the cost of gas in the current year. With great regret we have felt it necessary to give notice that, as from last Christmas, we must resume the price of 4s. 2d. per 1000 c.ft., which was in force at the end of 1918. I still hope that we may be able to reduce the price again before long.

DIVIDENDS AND SLIDING-SCALE.

I regret to say that the prosperity of the Company (and in spite of war conditions the Company has been prosperous and successful) has brought no corresponding advantage to the shareholders. We are only able to recommend the payment of dividends at the miserable rate of £3 6s. 8d. p.ct. per annum on the £4 p.ct. stock, and £2 13s. 4d. p.ct. per annum on the £3½ p.ct. stock, because the rates of dividend which, under the Company's Acts, may be paid to shareholders is fixed by a sliding-scale, which was agreed upon forty-five years ago, with a slight modification made nearly twenty years ago. It was designed to meet conditions totally different from those which now obtain. But hitherto the gas industry has not been able to obtain from Parliament any adequate relief. The legislation of 1918, which

was known as the Statutory Undertakings (Temporary Increase of Charges) Act, enables the Company, with the licence of the Board of Trade, to pay a dividend of £3 p.ct. when the price of gas charged is over 3s. 8d. per 1000 c.ft. But this miserable measure of relief was not operative when the price was 3s. 8d. per 1000 c.ft., because the sliding-scale authorizes the payment of a slightly better dividend. We shall, however, derive some small benefit from it at the present price of 4s. 2d. Gas shareholders since the commencement of the war have lost nearly half their dividends, and nearly half the capital value of their property; and to leave them in this position is neither just to them nor in the true interest of the community. The temporary advantage to consumers of gas is not large; and it is purchased at a high cost in the future. Hitherto money required for gas undertakings has been raised cheaply and readily. In future, if no adequate relief is given, investors will be slow to subscribe to concerns so hardly dealt with; and, even if they do put their money into them, they will require a high return for it. Consequently, the price of gas will be permanently raised to the detriment of the consumer. It is the bare truth to say that much of the mischief done in this way to the consumer will have been caused by the short-sighted and narrow-minded policy of the public authorities who opposed giving a fair measure of relief in the fallacious supposition that they were protecting the interests of the public. This is borne out by the fact that recent attempts to issue gas preference and debenture stocks, even where a high return was offered to the public, have not been a success. Unless Parliament speedily takes measures to adjust the sliding-scale to the circumstances of the time, it will be still more difficult in future to raise capital. It is obvious that large sums of capital will be required in order to meet the increased and increasing demands for gas, and to carry out improvements in the works which have been postponed for five years, owing to the war.

THE PROMISED GOVERNMENT BILL.

You have probably seen in the Public Press notices of the Company's intentions to promote a Bill in the present session of Parliament. After most careful and anxious consideration, the Directors decided not to deposit a Bill in view of an announcement of the intention of the Board of Trade to introduce one, dealing with the whole gas industry, and because we received an intimation that the authorities of Parliament were strongly of opinion that Bills affecting individual companies should not be introduced in the same session as the Government Bill. We also found that our proposals for relief would conflict with those of other companies who had decided to apply for similar legislation. It must not be thought that the sliding-scale has in any way failed. You are aware that the sliding-scale fixed a standard price for gas of a standard quality on which a standard rate of dividend might be paid, which dividend might be increased or diminished by a specific increment as the price of gas was lowered or raised. This Company was the first to adopt the sliding-scale by its Act of 1875; and for forty years (up to 1915), it worked admirably, with justice to all, and to the satisfaction of everyone. In 1901, following the example of the South Metropolitan Gas Company, the Company offered to the employees a share of the profit as a bonus for good work, to vary in a similar manner to the dividend of the shareholders. The principle of the sliding-scale is as just and as applicable as ever. Altered conditions have not affected the principle. All that is required is that one or other of the standards should be adjusted to the increased cost of raw materials, and the higher wages which have now to be paid. Such an adjustment can easily be effected; for the percentage of extra cost of manufacture is readily ascertainable, and is in large measure the same for the whole gas industry. A proportionate increase in the standard price of gas would make the requisite change. Where the circumstances of one undertaking differed from others, a small tribunal set up under the authority of the Board of Trade could readily make any adjustment required.

OBJECTIONS TO CERTAIN PROPOSALS FOR REVISION.

It has been stated in the Technical Press that a proposal was recently made to the Board of Trade that the standard price should be in future the price charged for gas on Jan. 1, 1920—the standard rate of dividend and the sliding-scale remaining as at present; and that a secondary sliding-scale should be super-imposed, varying the standard price in accordance with the delivered cost of coal. Such an arrangement, however, is neither in the interest of the public, nor to the permanent advantage of the gas industry. The price charged for gas is affected not only by the conditions under which the undertaking is working, but also by the skill and care of those who manage it; and to fix the standard price by the price charged would result in giving a high standard price, and consequently a large dividend to the careless manager, and a lower standard price and a lower dividend to the careful manager who studied the interest of his consumers, and kept his price down. The proposal for the secondary sliding-scale would be unintelligible both to Parliament and to the public, and would take away the all-important inducement which managers now have to bring coal cheaply to their works, and to carbonize it economically. The whole trend and object of the sliding-scale, and of the legislation of the last forty years, have been to reward all prudent and economical management, and to penalize extravagance and want of care; and it is essential, in the interest of the companies as well as of the public, that this principle should be kept in view in any legislation which may be passed. I trust, therefore, the principle of the sliding-scale will not be interfered with in the Bill which we understand is now being prepared by the Board of Trade.

RIGHT TO SUBSTANTIAL RELIEF.

I need not tell you that the gas industry has every right to claim a substantial measure of financial relief, both on account of the long period during which it has served the public efficiently and cheaply, and on account of the eminent services it rendered to the nation during the war. It is an indisputable fact that the war could not have been brought to a victorious issue by this country had it not been for the ample supply of high explosives, the materials for which were largely produced by the gas undertakings. If the industry is not now treated fairly and liberally, investors will leave it alone, the banks will be afraid to finance it, the industry will then drift into speculative hands, and all three partners—the shareholders, the customers, and the employees—will suffer. As has often been pointed out, gas is a necessity of life for the poorer classes, because it is available when other forms of fuel are scarce and dear; and it is convenient and cheap as a source of light, heat, and power in industrial operations.

WHY THE COMPANY SELLS GAS CHEAPER THAN THE OTHER METROPOLITAN COMPANIES.

I alluded just now to the fact that the Company has been able to sell gas, and is actually selling gas at the present time, at a cheaper rate than the other Metropolitan Companies; and you may wonder why this is so, seeing that our district is a comparatively poor one, and incapable of expansion, while our manufacture has to be carried out at three small stations, two of which are not situated on the River Thames. The answer is principally to be found in the fact that we have been able to carry our coals at a cheaper rate. Many years before the war commenced, as I have frequently explained to you, we acquired ships of our own. As the war progressed, and obstacles to the free running of ships multiplied (so that, instead of making an average of 64 return trips to the Tyne every year, the number fell to 30 or under), we bought more ships and bought them promptly—before the price of tonnage grew to the inordinate height it afterwards attained. Our ships were also more fortunate than those of our neighbours in escaping damage and loss by enemy action. Now that the running of our ships has improved, we have been able to sell two of our eight vessels at a handsome profit, which has gone to the relief of our capital account.

THE BEILBY AND OTHER REPORTS.

In a recent report on coal conservation made by Sir Dugald Clerk and other eminent scientists, stress was laid on the fact that gas is the most economical and effective form of utilizing the heat obtainable from coal. Coal in the past has been the mainstay of the country's prosperity in manufactures and commerce; and it is of urgent importance that our supply of coal shall be used in this crisis of the nation's history to the very best advantage. You will have seen references in the Public Press to what is known as the Beilby report of the Fuel Research Board, so-called because the Board was presided over by Sir George Beilby. The main recommendation of the Board in the report is that in future gas shall be sold by quality rather than by quantity—that is, that the consumer shall pay for the actual number of heat units which he consumes, irrespective of the quantity of gas. There are other proposals relating to the pressure at which gas shall be supplied, and the inert matter it may contain. But, generally speaking, the report can be accepted by gas companies as satisfactory, and as tending to give the gas consumer confidence that he is receiving exactly what he pays for.

INCREASED METER AND STOVE RENTS.

During the year, we have given notice to our consumers increasing the rent paid for meters and stoves. The Metropolis Gas Act, 1860, authorizes gas companies to charge a meter-rent on small meters not exceeding 10 p.ct. of the net cost of the meter; but hitherto, in order to promote and encourage a demand for gas, the Company has charged considerably less than it was entitled to. When the cost of materials and labour rose owing to the war, we found that we were supplying meters and stoves at a heavy loss; and we have therefore increased the charge to meet this loss as far as possible. I am happy to say that the fairness of the increase in the rents charged was recognized by our consumers. A few misunderstanding the position wrote and protested; but in all cases they were fully satisfied with the explanation given them.

THE COAL REBATE AND THE GAS ALLOWANCE.

The Public Press has acquainted you with the announcement which was made by the Government a short time ago that the price of coal used for domestic purposes had been reduced by 10s. a ton. At the same time, an order was issued to the gas companies that they were to obtain from the collieries a rebate of 10s. a ton on all coal used for the manufacture of gas which was consumed for domestic purposes, and that they were to hand on to the consumers of such gas a proportionate rebate in the price. The definition of domestic purpose is an arbitrary one laid down by the Coal Controller, and has the effect of bringing within the Order approximately 80 p.ct. of our consumers. The rebate they will obtain will be at the rate of 7½d. per 1000 c.ft. We have gone up 6d., but the domestic consumers will be getting 7½d. allowance. A curious result of this extraordinary order is that the rate of dividend will be governed by the price charged for the remaining 20 p.ct. of gas sold—an inversion of the practice which has hitherto obtained. I think we shall all agree that the creation of such anomalies is not in the long-run of benefit to the community at large, although some portions of it may obtain a temporary advantage.

SETTLEMENT OF DOMESTIC DIFFICULTIES.

Turning now to matters affecting our own Company more exclusively, we have inaugurated during the year a complete system of Committees of Workmen, Managers, and Directors, by which questions affecting the welfare of the employees may be discussed and settled without friction, and under which any employee who has a grievance, fancied or real, may bring it to the notice of his manager or fellow-workmen, and have it dealt with. Under the system established, each works and department has a Joint Committee of Workpeople and Managers, and the Committee makes the first attempt to settle any difficulty which may arise. If it fails, the question is referred to a Council (representing all the Committees and the management) over which the Chairman of the Company presides. Failing a settlement by the Council, the matter is referred to the Board, and if the Board cannot settle it to the satisfaction of those concerned, it must then go to the Industrial Council of the District. The establishment of these Committees has given great satisfaction to the men, and has assured them that those responsible for the management of the Company are really interested in their welfare, and are anxious to understand matters affecting them from their point of view Our relationship with our workmen has always been good; and it was never better than at the present time.

A CONTRIBUTORY PENSION SCHEME.

During the year we have also instituted a pension scheme, which is available for all the employees of the Company under 55 years of age

who are profit-sharers. Hitherto pensions have been granted both to the staff and to the workpeople at the pleasure of the Board; and no man has had any right or claim to such a pension nor have any of the employees contributed to it. We have now, with the advice and assistance of an eminent actuary, established a contributory pension scheme, to which all the employees who join the scheme contribute a fixed percentage of their salaries or wages, varying with their age. It is open to all existing profit-sharers, and compulsory to all future profit-sharers in the Company's service up to the age of 55. It entitles a man, on arriving at the age of 60, to a pension on a fixed scale. A feature of the scheme is that profit-sharers may pay their contributions either out of their salary or wages, or may have their profit-sharing bonus so far as it will go applied in payment of their contributions. In spite of the fact that in future the employees of the Company will be contributing themselves to what they have hitherto been receiving without any payment on their part, the scheme has given great satisfaction; and nearly all who are eligible have joined it. I am gratified in being able to report that a large number of the workpeople have decided to pay their contributions out of their wages rather than out of their profit-sharing bonus. This shows a disposition to thrift which we shall all appreciate in view of what we hear and read about the extravagance of the present day. I am convinced from experience that any interest which is shown by employers in the well-being of their workpeople, and any sympathy with their difficulties in making provision for old age and illness, meets with a ready response, which is most valuable to the success and prosperity of the institution.

A REVIEW OF THE ACCOUNTS—CAPITAL.

Turning to the accounts, you will see in the capital account that we have purchased some land. This land is in the neighbourhood of our Wapping works. The Wapping works are the smallest station of the Company; but we can manufacture more cheaply there than at either of the other two stations, because it is situated on the River Thames, and coal can be brought straight into the works *ex*-ship. The coal brought into the Wapping works last year cost 3s. 9d. less per ton than at Stepney, and 3s. 6d. per ton less than at Poplar. It is, therefore, our policy to buy land with a view to extending our Wapping works whenever it is possible to do so at a reasonable price. You will also notice in the capital account a credit of £55,180 representing two steamers which we sold, as we no longer required them. As I have explained, our present fleet of six ships is sufficient for all the Company's requirements when they are running without restriction. Altogether, the capital account, including the sum of £3938 depreciation on meters and fittings, shows a credit of £50,520, and has reduced the overdraft of £112,274 at the end of 1918 to £61,753.

THE REVENUE ACCOUNT.

Turning to the revenue account, you will perhaps have noticed an innovation. We have added an inset which shows the total wages and salaries paid in the year 1913 (the last complete pre-war year), and in the year 1919, from which you will see that wages have risen from £119,010 in 1913 to £303,403 in 1919, which is an increase of 154 p.ct.; and salaries from £22,976 in 1913 to £44,285 in 1919, which is practically double. The following figures are very instructive:

		Per 1000 C.Ft.
In 1913 the cost of salaries and wages was	£141,986,	or 10·01d.
1914	,, ,, 148,640,	or 10·60d.
1915	,, ,, 167,292,	or 11·71d.
1916	,, ,, 185,081,	or 12·63d.
1917	,, ,, 236,815,	or 15·43d.
1918	,, ,, 289,789,	or 19·61d.
1919	,, ,, 347,688,	or 22 00d.

It will be observed that by far the larger increase occurred after 1916. Since I last addressed you, there have been two war-wage awards—one last March by the Committee on Production, and one in December by the newly-constituted Industrial Court. Both awards, although varying slightly in detail, added 6s. per week to the wages of all male employees over 21 years of age. So that a man whose standard wage is 40s. per week is now entitled to

40s. *plus* 33s. 6d. = 73s. 6d. *plus* 12½ p.ct. (or 9s. 2d.) = 82s. 8d.

per week with overtime calculated on the higher amount. During the past year also, the hours worked were reduced from 50 to 47 per week. Coals and oil together cost practically the same amount as in 1918; but as we carbonized 21,015 tons of coal more, coal cost more by £38,123. Against this we used 50,587 gallons of oil less; and the cost was less by £37,271. The cost of coal into the works was per ton within a penny of the same price—being 37s. per ton in 1918, and 36s. 11d. per ton in 1919. But the value of the residual products in 1919 was 3s. 7d. per ton of coal more than in 1918, being 26s. 1d., against 22s. 6d. The saving in the cost of coal was due to these causes—first, the cessation of the necessity of insuring against war risks; and, secondly, the better running of the vessels, which enabled us to sell two steamers. Repair and maintenance of works figure at £139,386, as compared with £86,983 in 1918—an increase of £52,402. I have already explained that it is necessary now to take in hand repairs and improvements which were perforce left in abeyance during the war. I have also explained the increases in the items for superannuations, pension fund, Workmen's Benefit Society, and other allowances to our employees. The item "Allowance to Employees on Active Service" is, of course, much reduced, and will soon disappear altogether from the accounts. Turning to the other side of the account, the charge for gas throughout the year was 3s. 8d. per 1000 c.ft. In the previous year, it was 3s. 6d. for the first six months, then 3s. 10d. for a quarter, and 4s. 2d. for the last three months of the year. The receipts from gas show an increase of £45,396. It is interesting to note that the principal part of this increase took place in the last three months of the year; the last quarter actually showing an increase of nearly 19 p.ct. The increase was spread over the whole business of the Company. On gas sold through ordinary meters, it was 4¾ p.ct.; through prepayment meters it was 10 p.ct.; and the public lighting showed an increase of nearly 7¾ p.ct. In the first half of the year, the increase of all the gas sold was only 1·71 p.ct.; for the second half of the year, it was 12·44 p.ct.; and for the whole year it was 6·91 p.ct. For the year 1918 there was a decrease of nearly 4 p.ct. The same feature of a remarkable increase at the end of the year is found in other companies. The Gas Light and Coke Company had an increase of 21 p.ct. for the second half of the year, and 15¼ p.ct. for the full year. The South Metropolitan Company had an increase of 12·9 p.ct. for the second half year. A favourable feature of the accounts now before us is that the reduction in trade supplies which took place in 1918, owing to the discontinuance of munition and other war work, now appears to be ended; the use of gas being resumed for trade purposes by the installation of gas appliances for work of a more permanent nature. I have drawn your attention to the increase in the receipts from rents for meters, stoves, and prepayment fittings, which amounts to £9402. Our residual products gave us £66,061 more; the principal increase being for coke, which yielded more by £56,270. But the receipts from tar and sulphate also show heavy increases. Turning to the net revenue account, the balance of profit carried to that account amounts to £94,283, which is £5318 less than in 1918. Interest on debenture stock and bank loans amounted to £25,123, which was less by £5634 than in 1918, owing to our temporary loans being considerably less. There was an item of £662 for stamp duty on new capital. Deducting these items for interest and duty which amount to £25,785 from the net profit of £94,283 leaves £68,498. The miserably inadequate dividend of £3 6s. 8d. p.ct. on the 4 p.ct. stock and £2 13s. 4d. p.ct. on the 3½ p.ct. stock absorbs £65,376 for the year, and leaves £3122 to be added to the sum of £43,258 brought forward from the previous year—makes the amount carried forward to the current year £46,380. In the first half of the year, the profit gave a surplus of £26,807 over the dividend. In the second half of the year, the profit fell short of the dividend by £23,685. This will show the necessity of the increase of 6d. per 1000 c.ft. in the price of gas to which I have referred.

WITH JUSTICE A GOOD OUTLOOK.

I do not think that there is anything else in the Company's affairs to which I ought to draw special attention; and I will conclude my remarks by saying that the Company is as sound as it ever has been. It has better prospects of future prosperity than it has had for many years because the value of gas to the community is better appreciated. If we can obtain justice, and get the restriction on the payment of fair dividends removed, I have no doubt that the uniform success which has attended the Company's operations for the last forty years will be maintained and increased.

The DEPUTY-CHAIRMAN (Mr. H. E. Jones), in seconding, said there was little for him to say which would add to the lucidity with which the Chairman had clothed the information given in his remarks. He should like to say, however, having served the Company in many different capacities, how proud he was to be told recently by an eminent gas engineer that he knew of no Company which, at the price of its gas, gave better value than the Commercial Company to the consumer. He should also like to emphasize and doubly underline the last observations of the Chairman; for nothing had done more to show the great value of gas than the hardship and adversity brought upon the Company by the war. The scarcity of coal everywhere had proved that the consumer got on better with gas than coal; and he was not deterred by the fact that the gas companies had had to make large increases in the price of their commodity. It had been proved by scientific bodies that, while electricity could only give the consumers about 7½ p.ct. of the potential heat of coal, gas alone could give up to 30 p.ct., without taking into account the coke, tar, and other valuable products. These things constituted so important a point in the history of gas that he could not help inflicting them upon the proprietors.

The CHAIRMAN, replying to Mr. S. M. Wood, said that the Company were already paying pensions. But outside the new scheme, they would not have to do this in future, except to men already receiving them, and to those ineligible to join the scheme by reason of old age. But the Company would now contribute under the new scheme an equal amount to the workmen.

Mr. THOMAS JACKSON spoke of the relationship existing between the Company and its employees. He thought the establishing of Committees for discussing any differences that might occur was a happy augury for the future. If the proprietors were not receiving as much dividend as they would like, the prospects were very encouraging; and the Company were in this matter of the employees acting in a democratic spirit, rather than indulging merely in theorizing.

The motion was carried unanimously.

THE DIVIDENDS.

Proposed by the CHAIRMAN, and seconded by the DEPUTY-CHAIRMAN, a dividend was declared for the half year to Dec. 31, after the rates of £3 6s. 8d. p.ct. per annum on the 4 p.ct. stock, and £2 13s. 4d. p.ct. per annum upon the 3½ p.ct. stock, less income-tax.

RE-ELECTIONS.

The DEPUTY-CHAIRMAN moved the re-election of the retiring Directors—Messrs. W. G. Bradshaw and R. Y. Bevan, and the Right Hon. Sir Horace Brooks Marshall. He referred to the great services of the Chairman of the Company, to the value of those of Mr. Bevan, and to the knowledge and experience in industrial matters of the new Director.

Sir FREDERICK GREEN, K.B.E., seconded the motion, which was heartily carried.

The retiring Auditor (Mr. G. W. Ilsley) was reappointed, on the motion of Mr. R. JOLLIFFE, seconded by Mr. F. PEARSE.

INCREASE IN THE FEES OF THE DIRECTORS.

The CHAIRMAN next proposed—"That pursuant to the powers contained in section 17 of the Commercial Gas Act, 1918, the remuneration of the Directors be increased to £4750 per annum." He said he felt some little diffidence in getting up to propose this resolution. But he chose to do it, because he felt it was the more straightforward course than to accept the offers of proprietors to move the resolution. He wished to put the whole matter before them, as he felt he had a case which was a good one; and he hoped that, after hearing the explanation, the proprietors would agree that no apology was required for it. The remuneration which was at present payable to the Direc-

tors was fixed 45 years ago by the Company's 1875 Act. Since that time the Company had grown enormously. The sales of gas in 1919 were more than three-and-a-half times what they were in 1875; but the work which fell to the Directors had increased in still greater ratio. The administration of a gas company in 1875 was comparatively a simple matter. They had then only some 20,000 consumers; and now over 115,000. There had been added to their manufactures sulphate of ammonia, carburetted water gas, cyanide of potassium, and other products. They had purchased and managed their own ships. There had been instituted for the benefit of the employees, to the great advantage of the Company, Profit-Sharing, an Approved Society under the National Health Insurance Scheme, a Benefit Society, Pension Fund, and Works Committees, all of which involved frequent meetings with the men, and a great deal of thought and time. There was, also, attendance at meetings of the National Gas Council and Committees, Industrial Councils, and the Federation of Gas Employees. Since 1875 the Company had enjoyed a career of uninterrupted prosperity and progress; and up to 1914, the commencement of the late disastrous war, the shareholders' dividends had had an almost continuous upward tendency. During the whole period, although the Company's district was a poor and difficult one, they had sold gas at as low a price as, or even a lower price than, the other Metropolitan Companies, with a corresponding advantage to the shareholders in dividends. The only side of the Company which had not increased had been the Directors' fees. The Directors might have asked Parliament last year to make the increase; and there was no doubt that the request would have been readily granted. But they preferred to obtain power for the shareholders to deal with the matter. The fees that the Board received were much lower than those of other Metropolitan Companies. They amounted to £2500 a year, which was only £1758 when income-tax was deducted. The fees of the Directors of the Gas Light and Coke Company were £7500; the South Metropolitan had £5500; and the Wandsworth—a smaller company—£4400 per annum. If in the future the Company were to secure men of high standing and business knowledge and experience, they must remunerate them not less well than the Directors of other companies in a similar position. Therefore, it was in the interest of the Company, as well as of the present Directors, that the resolution which he now submitted should be passed. He might point out that nearly all the Directors had served the Company for a long period, and were drawing more or less near to the end of their careers. He himself had been a Director for 32 years, and could not expect to work for the Company much longer. He was quite aware that it might be said that it would be easy to find plenty of people willing to serve the Company as Directors at the present fees or at less. This no doubt was true; but it was also true that they could not get influential and successful business men in the front rank—men who would bring valuable business knowledge and experience with them—if they paid them less than the Directors of other similar companies. It would therefore be short-sighted policy on the part of the shareholders not to put the Company into the position of obtaining really first-class business men as vacancies in the directorate occurred.

Mr. H. S. FREEMAN seconded the motion.

Mr. WOOD objected to the proposal. He admitted that there was no doubt the Company had very conscientious Directors; but they were helped by a very expensive staff. He found that most of their Directors occupied seats on other Boards; and he gave figures to show the number of directorates with which they were connected.

Mr. JACKSON said that if £2500 was an equitable sum in 1875 for the Directors' fees, then it was inequitable in 1920. Although he was as a proprietor receiving less dividend, it was a question with him of acting equitably.

Mr. W. GROVES, J.P., remarked that Mr. Wood had proved that their Directors were valuable men, or there would not be such a great demand for them by other companies. He considered that the members of the Board were worth what was proposed, and were cheap at the price. The fees had not been raised since 1875; and he would like to know where else they would find anybody doing any work at the same rate as was paid for it in 1875. This fact alone should carry the vote without further reference. In such a Company as this, the Directors could soon lose £2500 a year, or even £25,000, if they were not men of brains, character, and judgment.

The motion was carried with only one dissentient—Mr. Wood.

The CHAIRMAN thanked the proprietors not only for their vote, but for the kindly sentiments that had been expressed and endorsed.

VOTES OF THANKS.

The CHAIRMAN proposed a vote of thanks to the officers, their staffs, and the workmen generally. Their officers were not paid a penny more than they deserved; and they all gave most commendable service. This applied also to the workpeople generally. To their excellent Chief Engineer and Manager the Company owed a good deal. It was due very much to the sympathetic way in which he conducted the business of the Company in connection with the men that the relations between them and the Company were of such an excellent character. Mr. Bradfield was a most able and energetic Secretary, and to him he (the Chairman) owed more than he could express.

Mr. H. WILLINGHAM GELL seconded the motion which was passed.

Mr. STANLEY H. JONES, in reply, said he could only say on behalf of the staff and the men whom he represented, that a vote such as had just been passed was thoroughly appreciated by them all. The work of the staff was fairly strenuous in these times; and he could frankly say that they one and all did the Company good service.

FINANCIAL RELIEF AND PROPAGANDA.

Mr. BRADFIELD, replying on behalf of himself and his clerical staff, said he could support all Mr. Jones had said. The staff had arduous times in present circumstances; and sometimes his own staff, it appeared to him, almost reached breaking-point. But they kept to their work, and executed it in a manner that was a credit to themselves and to the Company. With reference to the promised Government Bill for financial relief, he should like the proprietors to know that the National Gas Council were preparing propaganda to be circulated at the proper time among the stock and share holders of gas companies. It was not anticipated that the Government Bill would be introduced before Easter; but he should like to appeal to the proprietors to do their utmost to bring the justice of their claims before the public generally, and more especially their own members of Parliament, because, no matter the character of the literature prepared by the National Gas Council, it was the personal appeal that was most convincing.

A hearty vote of thanks was also passed to the Chairman and Directors.

WANDSWORTH, WIMBLEDON, AND EPSOM DISTRICT GAS COMPANY.

Objects of the Bill in Parliament Explained.

A Wharncliffe Meeting of the Company was held at the Cannon Street Hotel, E.C., last Tuesday, for the purpose of submitting to the proprietors for their approval the Bill which the Company are promoting in the present session of Parliament. Mr. H. E. JONES (the Chairman) presided over a gathering the dimensions of which called forth from him an expression of gratification that so many proprietors should have been sufficiently interested to attend what after all was merely a formal meeting insisted upon by Parliament.

The SECRETARY (Mr. C. W. Braine) then read the notice convening the meeting.

The CHAIRMAN said he would detain them as shortly as possible while he explained just why the Bill had been deposited. The proprietors would probably be aware that the whole system of the supply of gas was going to be radically altered, at the instance of the Fuel Research Board, headed by Sir George Beilby, who had made recommendations—which it would no doubt be to the interest of the industry to adopt—that the heat in the gas should be sold on a basis which would definitely fix it as heat. The idea of considering gas in relation to heat was not new to the proprietors, because when the Company were in Parliament they were asked by the authorities (and they saw no reason to object to doing so), instead of giving gas of a fixed illuminating power, to make it of a certain heating value. This had worked very well for something like eight years; so that they would not be taking on themselves any fresh burden in this respect. But the form in which they were to be tested and penalized if they failed to do their duty was entirely new, and would probably be incorporated in every Bill that went before Parliament. Their Company were in the field to take it up at once, because they were already doing something so near akin to it that it would make practically no difference to them. Instead of measuring gas and charging for it in cubic feet of a certain calorific value, they were now going to undertake that the charge should be for so many heat units. The constitution of the gas would be checked by an instrument which was something like a recording barometer.

THE QUESTION OF PRESSURE.

But in connection with this matter, Sir George Beiby had listened to a good many representations. It had been alleged by the railway companies that the gas undertakings did not supply gas at sufficient pressure. This allegation was not made specially against their own Company. Personally, he should consider himself something like a lunatic if he allowed any railway station to suffer from shortage of gas; but some people may have transgressed, and they had brought forward this demand from the railway companies. But Parliament did not legislate merely for railway companies; and he objected greatly to giving 2 inches pressure—not, as hitherto, in the main in the street, where the gas undertaking had full control, but at the end of the consumer's service, where he alone had control. A consumer might, after the service was laid, put on three or four times the number of lights originally started with and add a cooking-stove and some gas-fires, and in this way increase the drain to such an extent that there would be very little chance, at times of full use, of getting 2 inches pressure at the end of his service. But as the Company had undertaken to do it, it must be provided for. This might be done in two ways—by storing the gas in holders on the works, or, more wisely, by storing it on a piece of land at the far end of the main pipes, so that the gas put into the holders during certain hours when there was not a great demand would reinforce the mains by coming back from the tail-end and assisting the main stream. Now, the Company happened to be possessed of some surplus land in a part of the district which was as near as possible to the boundary of the Mitcham area where the Mitcham arterial mains stopped, and where the Wandsworth arterial mains also stopped. This was bought by them some time ago because really it was cheaper to buy 8 acres than to buy only 2 acres. They had undertaken to re-house some people who were in very insanitary dwellings which the health officials ought to have condemned twenty years earlier. As a matter of fact, however, they did not re-house them. They built some very nice houses, embracing many modern facilities which were considered necessary, but which were so expensive that the poor people who lived in the insanitary dwellings which had been demolished could not afford to take them, and they were occupied to-day by city clerks. He did not suggest that this was the sort of business the Company ought to embark upon; but it paid them to do it. The return covered interest and repairs—unlike the present housing schemes of the Government, which would probably not pay anybody anything. The surplus land bought beyond the 2 acres the Company really needed was a marshy, water-logged flat area, close to the River Wandle, and so unfitted for dwelling-houses, that they were warned by the authorities that they would not be allowed to build on it at all. Before even they could build on the piece they did build on to discharge their obligations, they had to raise it some 3 or 4 ft. with earth from the works. The remainder of the land being situated as it was, and derelict, it was clear that, under this new obligation regarding pressure, the Company had better store their gas there if they could. They believed they would be able to do this without it being objectionable to anybody. The holders would not be tall, and should give no offence. Incidentally, he might mention that the land

had been handed over during the last two or three years of the war, rent free, to the Local Authority for use as vegetable allotments; so that to this extent the Company had been public benefactors.

THE FINANCIAL PROVISIONS.

As the proprietors knew, the Company were paying miserable dividends; and they were obliged to borrow a good deal of money, because stocks and stores and materials of all kinds had risen enormously in cost. The Bill it was proposed should give them power to raise £500,000 in a preferential form. He was afraid that the dividend would have to be 6 p.ct.; and it would need the very closest economy on the part of the Directors to carry out the extensions necessary to maintain the business without prejudicing greatly the prospects for the future. A large capital meant a large profit; and a large profit meant a high price for gas. Beyond these purposes, they had thought well to insert a clause which he hoped might have the effect of enabling the Government, if they did bring in a Bill, to relieve the financial hardships of the Company. There was promise of a Bill to empower the Board of Trade to increase the price of gas and the dividends payable. Of course, there had been no failure on the part of the sliding-scale as a principle. As long ago as 1875 he recognized its value, and adopted it in the case of the Commercial Gas Company. So far from having broken-down, it remained a splendid principle. He only wished the colliers were paid on the same principle, so that the cheaper the coal the bigger would be the wages paid them. The position was that coal had gone up 125 p.ct., labour 150 p.ct., and all kinds of manufactured metal goods from 200 to 300 p.ct. Ordinary cast-iron pipes, such as they used to get for from £4 to £5 a ton, were to-day from £16 to £20 a ton. He advised them to save outlay on these pipes by adopting the gasholder scheme. In addition to the clause enabling the Company to make immediate use of any proposals that might be evolved by Parliament and by the Board of Trade, there was provision for annual instead of half-yearly meetings. There were some further small domestic facilities, to bring them in line with modern practice. There was nothing in the Bill that could be expensive and cost much for opposition, except that some people living opposite the piece of land referred to in Merton Road were making a great fuss because they thought it would spoil the amenities. He moved that the Directors be authorized to proceed with the promotion of the Bill, subject to such alterations or additions as Parliament might think fit to make.

The Deputy-Chairman (Mr. R. Garraway Rice) formally seconded the motion.

The Chairman remarked that if there was doubt on any point, Mr. Arthur Lees, their Parliamentary Agent, was present to clear it up.

Alderman Plumridge drew attention to the urgent need for better education of the public on gas company administration. It was, he said, surprising to find how few men there were who understood the working of the sliding-scale. It would be greatly to the interest of shareholders in gas undertakings if the general public were taken into their confidence. He was frequently told that the companies were making a great profit out of the high price of gas. People could not understand that this high price of gas meant a lower dividend. If something could be done to remedy this state of affairs, it would be a great advantage. If the public could also be made to know how unfairly the gas industry had been treated during the war, and was now being treated, it would have a very good effect. He would like to see the sliding-scale introduced into every industry.

The Chairman said he quite agreed. At a time when some of the Company's shareholders were receiving only £3 7s. 6d. p.ct., they were asked by their bankers to pay 6 p.ct. for the loans which were necessary to enable them to carry on (because it was impossible to raise capital). Inasmuch as the prices of things had gone up so much, they were owing their bankers to-day £292,000. Some of the Wandsworth stockholders got £3 17s. p.ct., and there was a little 4 p.ct. stock; but the bulk of it did not get much more than 3½ p.ct., at a time when the Government were borrowing at 5½ p.ct., and no bankers in the country would lend at less than 6½ p.ct. There was great need for such education as the last speaker had referred to, though the sliding-scale was really very simple.

Mr. Hennell assumed that the £500,000 of preference stock would come in front of all the existing stockholders other than the debenture holders. Would the rights of the present stockholders be affected in any other way, and would there be any advantage offered to them in the way of subscribing for the new stock?

The Chairman said the 6 p.ct. preference stock would be only temporary; and it would have to be put up to public auction. It would constitute while it existed a considerable burden on the profits of the Company, unless Parliament recognized the position. They had to decide whether they would give up business or go on. If they went on, they must pay the market price for capital; but they would not pay it a moment longer than was necessary.

Mr. G. Herriott (a profit-sharer) said the Gas Light and Coke Company with a dividend of not less than 3 p.ct. paid their profit-sharers a 3 p.ct. minimum also; whereas with the Wandsworth Company the price of gas to-day was so high that under the sliding-scale the bonus of the profit-sharers had disappeared.

The Chairman pointed out that in the case of their Company the bonus had been as much as 7 p.ct., when the gas was the cheapest in London. There was every hope that when the Government Bill came along they would be able to distribute a larger amount in the shape of dividend. They had to get everything on a level keel and a proper footing; and then they hoped they would go back to the time when the Wandsworth profit-sharers got the highest bonus in London.

This concluded the meeting.

Still Engine, Ltd.—A company has been formed, with a capital of £300,000, in £1 shares, to acquire patents and inventions, to carry on the business of manufacturers of and dealers in oil, gas, and other engines and motors, cycle and automobile builders, &c. There are agreements (1) with the Engine Development Company, Ltd., and (2) with W. J. Still and F. E. Dyke Acland. The registered office is at No. 7, Princes Street, Westminster, S.W.

TOTTENHAM DISTRICT LIGHT, HEAT, AND POWER COMPANY.

The Annual Meeting of the Company was held last Friday, at the Offices, No. 639, High Road, Tottenham—the Rt. Hon. Sir Daniel Ford Goddard in the chair.

The Secretary (Mr. E. J. K. Fussell) read the notice convening the meeting; and the Directors' report and accounts were taken as read.

A Hedge of Regulations, Orders, and Restrictions.

The Chairman, in moving the adoption of the report and accounts, said they met that day after an experience of twelve months of peace. They had not been disturbed during that time by any of those alarms of war which for so many years had made business very difficult. They found themselves, however, not by any means at peace; for gas companies all over the country were now hedged around with all kinds of regulations, orders, and restrictions—many of them ill conceived and considered, and most of them detrimental to the gas industry. There was, as the proprietors knew very well, a Fuel and Lighting Rationing Order which was in force all through last winter, and which naturally had the effect of reducing their sales of gas—at all events in the earlier part of the year. Happily, so far as gas was concerned, the Order was no longer in force. Then, at the end of July, the Government suddenly raised the price of coal by 6s. per ton. He did not criticize the wisdom of doing this; but he did say it was done at a very ill-judged time, because it meant that during the whole of August and September gas companies had to pay the extra 6s. per ton for coal, but had no opportunity of getting it back from the consumers until that quarter's reading of the meters had been taken. Therefore, the increase came at a very bad time for the Company. After raising the price of coal by 6s. in July, towards the end of November the Government brought in the startling edict that the price of coal used for domestic purposes was to be reduced by 10s. per ton. Instead of owning-up frankly to the mistake of putting such a large increase on the price of coal in July, and adopting the better plan of making a uniform reduction in the price of coal which would have benefited everybody, the Government adopted a very cumbrous and novel way of making a reduction to one class of consumers. He did not know if the proprietors had realized what the difficulties of this order really were to gas companies; but this was what had happened: Gas companies first of all had to estimate the quantity of coal they used for supplying gas for domestic purposes. Then they had to take the estimated percentage as a rebate or discount off their coal bills. They had to put to a special account the whole of the amounts so deducted. Then they had to estimate its equivalent in pence per 1000 c.ft. of gas sold; and at the end of the March quarter, they had to hand to the consumers the amount due to them as an allowance off the quarter's gas bills. The proprietors would see from this what huge difficulties were involved; how much clerical work was necessitated by it; and how much more expense. The Government had acknowledged that it would mean a certain expense to gas companies to do this; and they had therefore accorded to them the "handsome" allowance of 5 p.ct. of the rebate to pay for their expenses in this regard. The Order was a complicated one; and it was very troublesome to understand. For instance, theatres, music halls, cinemas, railway stations, and shops—all these were to get a reduction from the 10s. per ton of coal, because they were classified as domestic consumers; but bakehouses, laundries, and dairies having to do every day with the living of the people did not get any of the reduction, because they were not considered to be domestic cases. This was very strange, and difficult to understand. It was more difficult still when they went a little farther. Industries conducted at home were industrial, and not domestic. See what this meant. It meant that a tailor who worked in his own home, and did repairing work there, had the gas he used for the irons required in his business classified as industrial; and there was no reduction on that. But the gas he used for boiling his water was domestic gas; and he had a reduction on that. How in the name of reason was any gas company to determine how much gas such a tailor used for his irons, and how much fuel he used for his pot. It seemed to him (Sir Daniel) a most difficult thing; and the whole business was as clear as mud. [Laughter.] These were some of the freaks of Government policy. He must tell the proprietors—it was his duty to tell them—how it would affect their district. The rebate they estimated they would get by the 10s. reduction on domestic coal amounted to £48,000. The whole of this with the exception of the paltry 5 p.ct. for expenses would be passed on to the consumers; and the Board had come to the conclusion that this would mean the equivalent of 6d. per 1000 c.ft. In the case of some companies, it was more; in others, less. But if the equivalent was not correct, it would not affect the consumers. If 6d. was not sufficient, and there was a balance left in hand, it was to be carried forward to the next quarter. It still belonged to the consumer; and its payment would be merely delayed. If, on the other hand, they over-estimated the allowance, the deficit could be carried forward to the following quarter.

DIVIDEND AND CAPITAL DEPRECIATION—THE PROMISED BILL.

Now passing from this to the accounts. Regarding statements "A" and "B" of the capital account, there was no variation in them. The Company had power to raise fresh capital; and looking forward to the developments of the future, there was no doubt they would sooner or later have to raise capital. But the proprietors would agree with him that the time was not propitious for doing this. He did not wish to throw the proprietors altogether into a slough of despond. There was one little grain of comfort. The Board of Trade had promised to introduce a Bill to meet the financial hardships of the industry. He hoped they might rely upon this promise. It had been made definitely to the National Gas Council, and had been repeated by more than one President of the Board. It was proposed to revise the sliding-scale. The object of this was clear. By giving a proper return for the money people had invested in the gas industry, there would be a better chance of raising fresh capital. The proprietors would understand the importance of this—the real national importance. He was not now speaking for their own Company alone. This was a national question. That it was so would be seen when it was considered that some

130 million pounds were invested in the gas industry of this country, and that, in consequence of the war and the sliding-scale arrangements, this huge capital was depreciated by very nearly 50 p.ct. Before the war, if the Company wanted capital, they could raise "B" stock at something like 116 p.ct.; now if they wanted to issue "B" stock, they would probably not get more than £52 p.ct. for it. This was the position as it stood to-day; and therefore they were looking forward with great anxiety, but with some hope that the Government would really consider the very difficult financial position of the gas industry, and would do something to alleviate it. Before the war when the Company obtained £116 for every £100 of "B" stock, this gave them £16 as a premium, which they were allowed to use as capital, and upon which they did not pay a penny of interest. This was of great advantage to the consumers. Now the premium had all gone, and capital could only be issued at a heavy discount. He wished to make an appeal which ought to be made by every chairman of a gas company. The proprietors in gas companies represented a large number of people; and he did most earnestly appeal to them, if they could bring any influence to bear upon their members of Parliament and local authorities, which would help forward this much-needed relief Bill, to take the opportunity of using it.

CAPITAL EXPENDITURE AND THE DIFFICULTY OF RAISING MONEY.

Coming to capital account "C," it would be seen that on new buildings, there had been expended £5780. Part of this was made up of £1297 spent on No. 3 vertical retort section. Some of it was expended for elevating oxide, for economizing labour in purification. The rest of it was mainly spent on extensions at the Ponders End works—for purifiers, various enlargements of main connections, for apparatus for dealing with the hot coke, and so forth. That was how the money had been expended. He need not remind the proprietors that it was intended but a few years ago to abandon the Ponders End works, because they were practically worn-out. They had been completely remodelled, and had now become a first-class station. The work was not quite finished. A water-gas plant had to be erected; and it was hoped they would produce 3 million c.ft. of gas per day from these renewed works. In regard to the expenditure on new mains, they had not spent much; but there would probably have to be a good deal of expenditure in the near future. The air was just now full of housing schemes; and there were housing schemes in their large and important gas-supply area. These would involve new mains, services, and fittings; and a very large sum of money. He might say that the schemes which had been approved in the district over which the Company had gas-supply control involved something like 3500 houses; and the cost of fitting-up these houses with gas had risen enormously. Before the war, the cost of putting an automatic installation into a house, including service, meter, cooking-stove, and the lights was about £6 per house. To-day the same work could not be done under something like £25 per house. So the proprietors would see at once what an enormous question this was. If they had to fit up these houses, it would involve an expenditure of something like £80,000. The local authorities had been made responsible for the housing schemes. Some of them in the country were already finding difficulty in borrowing the money required for them. Perhaps this would make them a little more sympathetic to companies of this kind, in their difficulty of having to find money to carry on business. Unless the gas industry throughout the country did receive fair treatment from the Government, it would be almost impossible to raise money on anything like reasonable terms for this development. He noticed that at the annual meeting of the Gas Light and Coke Company, the Governor stated that there was one gas company which sought to raise £20,000 by means of 6 p.ct. debentures—thoroughly secured debentures—at par, with the result that only £600 was applied for out of the £20,000, showing their present difficulty, unless they could offer investors something better. They could not be surprised at this when the Government were offering 5¾ p.ct. with all the credit of the country behind it. It would be seen that the depreciation account was a very important one. There was nothing new about it. It was all at the old rates. The result of the depreciation account was to bring the new expenditure of capital down to £1378.

COAL AND HIGH FREIGHT CHARGES.

Passing on to the revenue account, the most important item was coal; and during the year, it had cost £52,000 more than in the previous year, though only some 2775 tons more had been used. The average cost through the year had been 36s. 5d. per ton, as against 30s. 3d. the previous year. But this was not quite a fair figure to take, because the price in the second half of the year was 39s. 4d.; and at the present time coal was costing something very near £2 per ton. It might have been more. In the past they had been in the habit of having a considerable part of their coal seaborne. They generally relied upon obtaining a better class coal, and could get it delivered to them on reasonable terms. But during the past year the difficulties of getting ships, and the tremendously high rates of freight, had made this impossible. In consequence, they had been thrown-back upon railborne coal. As it happened, it had been an advantage rather than a disadvantage. The rates for railborne coal had not risen materially, while shipping freights had. To-day, if they brought coal from the Tyne down to London in a large steamer, it would cost 12s. 6d. per ton to do it; if it was brought by smaller steamers—say, 1000-ton steamers—it would cost 17s. per ton, and probably 10 p.ct. would be added. Gas companies who owned steamers, and themselves brought coal from the North, found that the cost for sailors, insurance, capital charges, depreciation, and all running expenses worked-out to something like 6s. per ton. From this it would be seen that somebody was making a most outrageous profit by charging 12s. 6d. and 17s.

COAL AND GAS MAKE—THE RISE IN THE PRICE OF OIL.

The make of gas during the year had not been very good. It had averaged 11,580 c.ft. per ton. This was not at one time considered a bad make. But in these days it ought to be better. In explanation, he should like to say that they had no control over it. They simply had to ask for coal; and the collieries sent them just what they liked. It was sometimes scarcely worth calling coal. It contained a large percentage of ash; and it was not suitable for gas-making purposes. Thus there was much difficulty in working it. They could not say anything. If they said they would not take it, no more would be sent; and they would have to shut-up their business altogether. This was the explanation of the make per ton not being so good as it ought to be. Oil was costing them 9d. per gallon, as against 1s. 2½d. But they could not draw much comfort from that, because the price was now rising rapidly. The last purchase made only the other day was at 1s. 0½d. per gallon; and from what they heard, it was likely to advance still further.

THE RISE IN WAGES, AND OTHER MATTERS.

Repairs and maintenance had increased by £27,000; and this was due entirely to the higher cost of materials and labour. When they came to carbonizing wages, it not appear that there was any great rise in the £26,764, against £25,829. In order, however, to arrive at a correct figure, they must go down the account to the item war bonus, £74,915. Part of this had to be added to the wages—viz., £7541. The total was therefore £34,305. Wages, of course, was a very serious charge; and the Directors could not help the amount. It was not within their control. The matter of wages came before Arbitration Courts, or now the Industrial Court; and everything was gone into very carefully. These were the adjustments they were compelled to make. Taking the whole of the labour in 1913—the last complete year before the war—the cost was £72,277, and in 1919, it was £165,859. In other words, the whole of the labour of the undertaking cost before the war about 7 8d. per 1000 c.ft. of gas sold; and to-day it cost 1s. 4½d. per 1000 c.ft. sold. He was not complaining, nor criticizing. He was only telling the proprietors of the increased charges, because they had the right to know the facts. Rates had gone up £4562. There was some little criticism made at the last meeting regarding this. It was then explained that, having put the matter before the Assessment Committee, the Company had secured a considerable reduction of their assessment. He thought sometimes that local authorities did not understand why the price of gas was going up. But perhaps it might be explained from what he had already said. The increase in rates alone was equivalent to ¾d. per 1000 c ft. of gas sold. The amount of cash actually paid in rates was nearly equal to the amount paid in dividend to the whole of the proprietors. This was rather a serious statement; but the fact was that in the current year, the rates amounted to something like £18,000, and the dividend only totalled £20,000.

AN UNFORTUNATE PUBLIC LIGHTING CONTRACT.

Coming to the happier side of the revenue account, the sale of gas showed an increase of about £100,000. This was due to the rise in the price of their commodity, which they were obliged to make on account of the increased cost of manufacture. He should like to say a few words about the public lighting. They had been able to make contracts with the public lighting authorities on what he should call fair and reasonable terms up to the present. There was one authority, however, with whom they had not yet been able to come to an agreement; but they hoped they would do so. This was the Tottenham Urban District Council. The Company had a pre-war contract with them. They then thought they were right in assuming that there would be a gradual decrease in the price of gas. It was so hoped; and therefore the contract was based on a decreasing price. The war came. The reverse had happened; and everything had gone up instead of down. The consequence was that this pre-war contract was bad, and a costly one, for the Company. He hoped the Council would not insist upon its being carried out. It could scarcely be termed a fair one under existing conditions. So he trusted that the Council would be ready to meet the Company in some reasonable way. It was not that the proprietors would get any benefit if they received more money from the Council. But if they did not get some little assistance from them in the form of a new contract, it would cost the whole of the consumers not only in the Tottenham area, but in all the Company's districts, something like ½d. more per 1000 c.ft. for their gas. This unfortunate contract was a ten-year one.

RESIDUALS, AND THE BALANCE.

Residuals had done very well. There was a nice increase of revenue from them. This was mainly due to the sale of coke, which had been regulated, and had brought in a good return. The only weak spot was sulphate of ammonia. This was not so satisfactory as they would like to see it. But they were giving close attention to it; and their chemist was going carefully into the matter. They hoped to see an improvement in the item. Tar was doing very well, and realizing on an average 4½d. per gallon. Taking all things together, after carrying £6000 to the renewal fund, they had a balance left on revenue account of £44,364.

THE ELECTRICITY UNDERTAKING.

Regarding the electricity undertaking, good progress had been made during the year; and a profit of £1142 had been obtained. The major part of it was made in the last six months; and it was still going on. They were very hopeful that this year the undertaking would show a much better return than in the past year.

PROFIT AND LOSS ACCOUNT.

On the profit and loss account, there were two items on the credit side which perhaps required a little explanation. One was "Income-tax rebate 1918, £3118." This was due to section 13, sub-section 1 of the Finance Act of 1914, which recognized that the effect of the war on gas undertakings did require some adjustment; and an adjustment was allowed, which happened to come into this year. This was the £3118. The second item was, "Income-tax 1919, £1225." This was a tax that had also been allowed the Company. It was due to a concession of 50 p.ct. more depreciation on gasholders and other things. This represented two years' allowance, which all came into this year's accounts.

PROSPECTS NOT VERY ROSY.

Regarding the future. Everybody liked to look forward to the future. Personally, his temperament was rather a sanguine one. Notwithstanding this, he was afraid he could not say the prospects were very rosy, because they were threatened with still further restrictions. They were threatened with restrictions in regard to the chemical component

parts of their gas. The matter had been brought before the Government; and restrictions might be imposed upon them. They might also have to sell their gas on a heat-unit basis in the future, instead of by cubic feet. He did not know that this would involve any expense, although it might bring upon the Company a good deal of trouble. Then railway rates had gone up 2s. per ton; and the charge for the hire of wagons for bringing coal had risen by 50 p.ct. This, it was estimated, would cost 2½d. per 1000 c.ft. There was the new wages award that was made last month, and which dated back to Dec. 1 last. The award was 5s. per week extra, *plus* that most unfortunate and disagreeable 12½ p.ct. This made it 5s. 7½d. per man per week. It was reckoned this would entail on them an expenditure of 1½d. per 1000 c.ft. Rates were also going up. He was afraid there was not much hope that they would go down for a long time. In the case of all municipalities of which he knew, the rates were ascending; and they could not estimate less than ½d. per 1000 c.ft. for that. There was also an increase in the price of oil. One other thing to which he should like to refer. It was that they found themselves in a little different position, because they now came within the scope of the Statutory Undertakings (Temporary Increase of Charges) Act of 1918. This might appear mystic to the proprietors. It was mainly brought about through the effect of the increase of labour wages last February, and the effect of the price of coal last July. These two changes had made it necessary to raise the price of gas; and the Directors therefore applied to the Board of Trade for the Company to come under the Act. They had the assent of the Board of Trade; and that day they were entitled to pay on the ordinary stock three-fourths of the standard rates of dividend. Thus they could pay £3 15s. p.ct. on their "A" stock, and £2 12s. 6d. on the "B" stock, which the proprietors would agree was a most unfair and most inadequate return for the capital they had placed in the undertaking. If they had not come under the Act, they would only have been able to pay 3¾ and 2 p.ct.; and therefore the advantage obtained was about 5s. p.ct. He wished he could hold out better hopes in regard to the future. The Company could cope with all the difficulties of manufacturing and distributing gas; but unless they could get some real relief from the Government in connection with the financial side of the undertaking, they must find themselves in increased difficulties.

Mr. Henry Bailey seconded the motion.

Mr. A. D. Wheatley asked whether the Company were likely to require any more capital at present.

The Chairman said they were not proposing to raise any at present. The Board naturally thought it wiser to see first what the Government were going to do for the industry.

Mr. H. C. Wells remarked that two years ago he suggested the necessity of restricting capital expenditure whenever possible; and the result showed how wise this was. He also asked whether the £108 charged for rates on the electricity undertaking was the right proportion. In the past, references had been made to the Ponders End works, which was far from complimentary. They were then said to be simply rubbish, and must be thrown away. Now it seemed they were a great advantage. In his opinion, the affairs of the Company looked anything but rosy.

Mr. H. Michel said it seemed that the rating had gone up 40 p.ct., though last year it appeared the Company had obtained a reduction of the assessment. The Courts had laid it down as an absolute bed-rock principle that no rating authority should rate on goodwill. In the case of statutory public utility companies, the rating authorities had for a good many years now taken into consideration the earning power of the particular concern with which they were dealing in arriving at the assessment. In connection with a company whose operations bore some comparison with their own, an eminent rating authority had lately expressed the opinion that, in consequence of the decreased carrying power, the directors had poor ground for an application for a reduction of the assessment. Although this company's assessment had been reduced somewhat, they had an increase of about 40 p.ct. in the rates. He knew the rates had gone up, and approached in the district 16s. in the pound. He also inquired whether there was any serious accumulation of arrears of repairs; and whether the auditors' fees were paid free of income-tax. He pointed out also that while gas investors were not being paid a fair dividend gas consumers were getting gas at less than cost price.

Another Proprietor asked what percentage the increase of wages was on pre-war rates.

The Chairman replied 130 per cent.

Mr. Riddell recognized the difficulties the Board had to encounter in running the business; but it should be remembered that they were selling gas, and so should try to give satisfaction to the consumers. In the September quarter, a good deal of dissatisfaction had been caused through the reading of the meters early in September; and the Company would have been better advised, in view of the increase in the price of gas, not to have proceeded on the lines they then did. He saw a new Director had been appointed; and he had hoped that, when a new man was elected, the small shareholders would have received representation.

Mr. W. Brown also spoke of the early taking of the meters, and asserted that the Company, once respected and admired, was now smiled at and ridiculed, and people were going over to electric light. Another thing that could not be understood was the continued changing of the consumers' meters.

The Chairman, in reply, said the amount paid for rates on the electricity undertaking was the full proportion according to the assessment. As to the Ponders End works, they were once in a derelict condition, but had been restored, and were now valuable works. The carbonizing plant had been rebuilt, and manual stoking had now been replaced by machine work; and there were also appliances for removing the coke. The works, which formerly had a productive capacity of about 1 million cubic feet, would now make 3 millions. As to the assessment of the works, they succeeded in obtaining a reduction of 25 p.ct. two years ago. They were always looking out for such reductions. But there had been a 40 p.ct. increase in rates lately; nearly 100 p.ct. in some cases. Mr. Michel mentioned 16s. in the pound; in one district it was 17s. 4d.. As to repairs, it had during the war been most difficult to maintain the works; and the difficulties had not decreased during the past year. The prices of materials and labour had gone up enormously. The moulders' strike had also seriously affected them. The Auditors paid their own income-tax. As to Mr. Riddell's remarks, the small shareholders were represented on the Board, and, in selecting Mr. Hay Morgan, this had been taken into consideration. In the September quarter, the meters were read a little earlier, because they had no chance of recouping themselves for the increase in July of 6s. per ton of coal until the meters were read; and they did not want to have a special reading, as this would have involved great expense. The changes of the meters were justified by their condition, as the Company had not been in the position to attend to them properly during the war.

The motion was unanimously carried.

The Dividends.

Moved by the Deputy Chairman (Mr. Henry Woodall), and seconded by Mr. H. D. Ellis, dividends were declared for the past half year at the rate of 3¾ p.ct. per annum on the "A" stock and £2 12s. 6d. p.ct. on the "B" stock.

Re-Election of Directors—A Little Breeze.

Proposed by the Chairman, and seconded by Mr. Bailey, Mr. H. D. Ellis was unanimously re-elected a member of the Board.

The Chairman then moved that Mr. G. Hay Morgan, K.C., B.Sc., be re-elected to his seat at the Board. He remarked that, owing to the retirement of their friend, Mr. John Ford, it was desirable to fill the vacancy—at all events until the annual meeting of the proprietors. The choice of a Director must depend on whether his election would be of any advantage to the Company. Mr. Hay Morgan's knowledge of legal matters was of great importance and assistance to the Board. In addition, he was a man of science; and the details of the chemical work carried on by the Company were quite familiar to him. He had proved a very valuable colleague during the time he had been at the work.

The Deputy-Chairman seconded the motion.

Mr. Wheatley asked who proposed and who seconded Mr. Hay Morgan's election on the Board. He also wanted to know the amount of his holding, when he purchased it, the price he paid, and how long he had been a stockholder. His (Mr. Wheatley's) wife and himself held £20,000 of stock, which was only worth £10,000 at present market prices; and between them they were the largest stockholders in the Company. He did not think they wanted a King's Counsel on the Board; but they did want business men. He protested against the motion before the meeting.

Mr. Riddell asked whether the Company had not its own legal adviser?

Mr. Wells inquired whether Mr. Hay Morgan was a resident in the district.

Mr. Brown remarked that surely there were men connected with the Company who would make good Directors without bringing in an outsider.

The Chairman said he believed he himself proposed the election of Mr. Hay Morgan. He held the necessary Director's qualification—£500. He had no information as to what price he paid for his shares; he supposed it was the then market price.

Mr. Wheatley: I think Mr. Hay Morgan himself should tell us when he purchased his stock, and what he paid for it.

The Chairman said that that was quite outside the business before them. They had two local Directors on the Board—Mr. Randall and Mr. Bailey. Mr. Hay Morgan was a man of affairs; and he understood commerce and business.

Mr. Browne said that hitherto their meetings had been of a very happy character; but the Directors could now quite see the feelings of the proprietors. He proposed that a further meeting be held to reconsider this matter. He asked what notice was necessary for bringing forward another candidate?

The Chairman: Twenty-eight days.

Mr. Dando seconded the proposal.

There was some further discussion; and on the proposal for adjournment being put, it was defeated. On the Chairman's motion being submitted, Mr. Hay Morgan was re-elected by 27 to 23 votes. Several proprietors abstained from voting. Mr. Wheatley and two or three other proprietors protested by leaving the room.

Re-Election of an Auditor.

Moved by Dr. Scott, and seconded by Mr. H. Mitchell, Mr. William Cash, F.C.A., was re-elected one of the Auditors.

Vote of Thanks.

Proposed by Mr. Michel, and seconded by Mr. Mackay, the Chairman and Directors, the Chief Engineer and General Manager (Mr. A. E. Broadberry), the Secretary, the staff, and all employees were heartily thanked for their services.

In view of the length of the meeting, the Chairman made response for all included in the vote.

Fleetwood Gas Company.—The half-yearly report of the Fleetwood Gas Company shows a profit of £866, reduced by loan interest to £582, which, added to £1048 brought forward, makes a disposable balance of £1630. The Directors recommend a dividend at the rate of 3¾ p.ct. per annum on the ordinary stock. The quantity of gas sold in 1919 was 64,070,700 c.ft., as compared with 55,328,900 c.ft. in 1918.

Bath Gas Light and Coke Company.—The Directors regret that for the year ended Dec. 31 they are unable to present as satisfactory a statement of accounts as in the past few years. This is owing to the continued advance in the price of coal and all other materials and rises in wages granted by Boards of Arbitration. The returns for residuals are satisfactory. The price of gas was increased, as from the end of the September quarter, by 3d. per 1000 c.ft., making it 2s. 6d. This still bears favourable comparison with other companies. Following their action of the past two years, the Directors have set aside a further sum of £4000 to meet the cost of work on renewal of plant delayed on account of the war. A dividend at the rate of 5 p.ct. per annum, less income-tax, is recommended.

SOUTH SUBURBAN GAS COMPANY'S REPORT.

The report (signed by the Chairman, Mr. Charles Hunt) to be submitted at the annual meeting of the Company on Friday of this week, dealing with the accounts for the year ended Dec. 31, states that the all-round addition of 6s. per ton to the price of coal on July 21 last was followed in the case of this and other companies in the South of England by an intimation from the Coal Controller that supplies must be drawn by sea from the Durham coalfield, instead of by rail from the Midland districts as heretofore. This meant a further additional cost of about 8s. per ton; and it therefore became necessary to apply to the Board of Trade for authority to raise the price of gas beyond that previously sanctioned. Authority was accordingly given to charge an increased price of 1s. 2d. per 1000 c.ft. as from the Michaelmas quarter. Effect will be given to the 10s. per ton drop, as from Dec. 1 last, in the price of coal used for domestic purposes, by allowance off the gas accounts for the current and each succeeding quarter during the continuance of the arrangement. Three of the Company's contracts for coal were cancelled by the Coal Controller last autumn, in addition to which there has been the utmost difficulty in securing the fulfilment of the remaining contracts. The attention of the Coal Controller has been called to this, and to the pecuniary loss incurred by the Company in obtaining the necessary supplies elsewhere.

The gas sales for the year show a small decrease of 1·3 p.ct., which is much more than accounted for by the falling-off in the requirements for munitions and other purposes connected with the war. Private and public consumption together show an increase of 9·38 p.ct. The number of consumers has increased by 1285; and the percentage of cookers, gas-fires, &c., on hire now stands at the high figure of 112, though it has been found impossible to meet the full demand for these appliances owing to the difficulty of obtaining them from the manufacturers.

The net revenue account shows that, including the balance of £22,549 brought forward from last year, and after providing for debenture and other interest, and the dividend paid for the half year ended June 30 last, the amount available for dividend is £29,424, out of which the Directors recommend the payment of a dividend for the past half year, subject to authorization by the Board of Trade, at the rate of 3¾ p.ct. per annum (less income-tax) on the 5 p.ct. ordinary stock, carrying forward to the next account the sum of £9028.

A Bill to authorize the Company to raise further capital, to sell gas on a heat-unit basis, to increase the standard price and dividend, and for other purposes, has been promoted by the Directors, and will be submitted for consideration at a special meeting of which notice has been given. The memorial to commemorate the services of the Company's co-partners and employees who were engaged in the war is approaching completion; and Lord Robert Cecil, K.C., M.P., has consented to perform the ceremony of unveiling it. Mr. S. Y. Shoubridge retired on superannuation on July 1 from the position of Chief Engineer to the Company, which he had occupied for 22 years; and the Directors have placed on record their high appreciation of his faithful services throughout this period. He is succeeded by Mr. John Terrace, late Engineer and Manager of the Great Grimsby Gas Company, and previously Assistant Engineer of the Tottenham District Light, Heat, and Power Company.

CARDIFF GAS COMPANY.

The annual meeting of the Cardiff Gas Light and Coke Company was held on Tuesday last—Mr. CHARLES E. DOVEY, F.C.A. (the Chairman), presiding.

The CHAIRMAN, in moving the adoption of the report and accounts, said the war had changed the whole basis upon which the fabric of commercial life rested, and the final effect on gas and other undertakings could not yet be determined. For many years they had been able to give the shareholders a satisfactory account of successful operations; and the present report concerned a period of trading under partial Government control. Although they now had greater freedom of contract, the burdens imposed by the increased cost of manufacture, wages, coal, and material, left them practically helpless in their efforts to carry on at anything like a profit, notwithstanding the efficiency of their management and the untiring efforts of all connected with the industry. The shareholders knew they were what is described as a maximum price company, with a fixed price of 3s. per 1000 c.ft. for sales of gas, as settled in 1906. This price was sufficiently remunerative in normal times to pay a dividend, which never exceeded 5 p.ct., and to make proper statutory reserves. But now the raising of the cost of coal and wages to unheard of prices, the difficulty of obtaining material, the dislocation of executive administration, and other restrictive agencies, left them unable to achieve their former excellent results. In spite of these drawbacks, the development of their business operations was almost phenomenal. Last year marked an increased output of over 218,000,000 c.ft. of gas—in itself exceeding the total consumption of such important centres as Barry, Merthyr, Chesterfield, Ramsgate, and Weymouth. This obviously ought to put the Company in a better financial condition. Their standing capital charges had not been materially increased; but the enhanced cost of labour, coal, oil, &c., had cut so vitally into the proposition that the element of profit-making was destroyed altogether. The sale of gas realized £260,000, as against £234,000 last year; coke and other residuals £104,000, compared with £73,000; rentals, stoves, and meters, £37,500, against £30,000; fittings, £10,251, as compared with £5914. But the manufacture of gas had cost £287,000, as against £230,000 last year. These payments would have been heavier; but £29,643 had been debited to the renewal fund reserve, and accumulations under this heading were reduced by the amount. Other payments were normal; and nothing this year was put to the renewal fund reserve. Coal cost them £152,000 more than in a similar pre-war period. They were particularly hard-hit in Wales, because they had to bear 2s. 6d. per ton extra on coal beyond what was paid elsewhere in the United Kingdom. To-day they had to pay £15 12s. 6d. for cast-iron mains that cost £4 19s. 6d. in 1913. Everything else was proportionately dearer. The cost of gas to consumers in adjoining towns was considerably higher than in Cardiff—their increased 24 p.ct. charges comparing with 65 to 100 p.ct. on pre-war rates. The increased charges of the Corporation electric supply by 75 p.ct. showed the favourable terms enjoyed by their customers, while inflicting a measure of loss on the Company. The conditions imposed were not fair or equitable; and in order to obtain even the concessions made, they had to show a bad balance-sheet, and be content with 3¾ p.ct. dividend with no power to make up out of subsequent profits the difference between this and 5 p.ct. The reduction of their dividend was certainly not likely to attract investments. Gas, of utmost value to the nation, was not permitted the privileges conceded to railway companies, the latter being allowed the pre-war maximum dividend. But for the foresight of the Directors in anticipating increased outputs, the constantly increasing demands could not have been met; and principally in this connection a temporary loan of £107,000 had to be incurred. The Government had given a definite pledge to legislate for the relief of the strained financial position of the gas industry.

The report was adopted.

The General Manager (Mr. George Clarry), the Engineer (Mr. H. D. Madden), and the staff were specially thanked for their invaluable services.

HOVE TOWN COUNCIL AND THE GAS COMPANY.

The Hove Town Council have unanimously decided to oppose the Bill which is being promoted by the Brighton and Hove General Gas Company; and the Legal and Parliamentary Committee have submitted the following grounds of objection.

Clauses 4 to 18 authorize the issue of additional share and loan capital by the Company, and contain certain other provisions in relation thereto. The grant of these large additional powers would be contrary to public interest and otherwise objectionable.

Clauses 19, 20, and 37 propose to sanction considerable increases in the standard price of gas and in the charges for hire of prepayment meters; and clauses 22 and 24 contain further provisions as to charges by the Company. All the above are unnecessary, unjustifiable, and unfair.

By clause 21 the Company seek further powers of breaking-up and interfering with public streets and roads, causing much inconvenience, and for which there is no public necessity or justification.

Clause 26 seeks to increase the remuneration paid to Directors, and will impose an unfair aud unnecessarily large burden on consumers.

Clause 29 will confer powers as to the sale or supply of gas on a heat basis. The Committee consider that the Company should be put under obligation to adopt a heat-unit basis of charge subject to provisions for the protection of the Corporation and the consumers.

By clause 30 power is taken to establish a scheme of profit-sharing with employees. Your Committee recommend that no objection be taken to the establishment of such a scheme, provided it is established in consultation with the Ministry of Labour or other appropriate authority.

The Company should be put under obligation to extend their mains to any part of their statutory limits where there is a reasonable demand for a supply of gas, and should be required to lay mains in every street or road in which houses have been, or are about to be, erected under any housing scheme of the Council.

CARBURETTORS AND SULPHUR IN BENZOL.

At the request of the National Council of the Commercial Motor Users' Association, the Petroleum Executive and the Aeronautical Inspection Department last year undertook to make investigations as to the effect of sulphur in benzol on various metals. The specifiation of the National Benzol Association fixed 0·4 p.ct. of sulphur as the maximum. The Association have received the results of the investigation concerning benzol specially procured with an excessive sulphur content and the permission of Sir John Cadman to publish the following report.

Four samples of benzol were supplied, stated to contain 0·1, 0·2, 0·4, and 0·8 p.ct. of sulphur respectively. Chemical examination showed that the sulphur was nearly all present as carbon bisulphide. The metals used were copper, brass, phospher bronze, aluminium, and cast iron. After prolonged contact with benzol containing 0·8 p.ct. of combined sulphur, a slight discoloration of the surface was obtained with copper and brass. In the presence of moist air, also, slight action appears to take place; but no measurable difference occurred in the weights of the metals before and after the action. The iron and steel rusted in the moist air; but there was no evidence of the formation of any oxidation products of sulphur. In view of these results, as no corrosion occurred, the answer to the questions as to whether corrosion had in any case reached the degree of perforation of a sheet of metal is in the negative. A sample of the deposit found in carburettors or aero engines consisted of a greyish-white powder decidedly alkaline to litmus, and containing metallic particles. These metallic particles consisted of aluminium with traces of zinc, copper, and iron. The remainder of the deposit was sodium silicate with traces of carbonate and sulphide; the latter being probably impurities present in the sodium silicate used for "doping" the carburettors. There is, therefore, no evidence that the sulphur in benzol—there is no free sulphur—has any corrosive effect on carburettors.

Increased Consumption at Dorchester.—The Directors of the Dorchester Gas and Coke Company, Ltd., state in their report for the year ended Dec. 31 that there has been an increased consumption of gas to the extent of 3½ million c.ft., as compared with the previous year. Dividends at the rate of 8 p.ct. on the ordinary capital and 6 p.ct. on the preference capital (both less income-tax) are recommended. As to the Dorchester Gas-Fittings Company, the Directors recommend the payment of a dividend of 6d. per share, with a carry-forward of £493.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *Feb.* 16.

Pitch still maintains its very firm tone, and makers are selling at over 110s. net per ton in bulk *ex* works. Creosote is unaltered at 9d. net per gallon. Motor benzol is in great demand. Other tar spirits show no material change. Crude carbolic 60's is worth about 3s. 6d. net per gallon. Anthracene 40 p.ct. is 9d. net per unit per cwt.

There is nothing fresh to report for sulphate of ammonia.

Tar Products in the Provinces.

Feb. 16.

The average values for gas-works products during the week were: Gas-works coal tar, 64s. 9d. to 69s. 9d. Pitch, East Coast, 105s. to 107s. 6d. per ton f.a.s.; West Coast—Manchester, 95s. to 100s.; Liverpool, 95s. to 100s.; Clyde, 105s. to 107s. 6d. nominal. Benzol 90 p.ct., North, 2s. 3d. to 2s. 4d.; crude 65 p.ct. at 120° C., 1s. 5d. to 1s. 7d. naked at makers' works; 50-90 p.ct. naked, North, 2s. 2d. to 2s. 4d. Toluol, naked, North, 2s. 5d. to 2s. 6d. nominal. Coal tar crude naphtha in bulk, North, 10d. to 10½d. Solvent naphtha, naked, North, 3s. 3d. to 3s. 4d. Heavy naphtha, North, 3s. 2d. to 3s. 3d. Creosote, in bulk, North, liquid, 8¼d. to 9d.; salty, 7d. to 7½d. Heavy oils, in bulk, North, 8½d. to 9d. Carbolic acid, 60 p.ct., 3s. 3d. to 3s. 6d. Naphthalene, £18 to £22; salts, £6 10s. to £7 10s., bags included. Anthracene, "A" quality, 7½d. to 8d. per minimum 40 p.ct.; "B" quality, nominal.

FROM A MARKET CORRESPONDENT.

Tar Products.

There is no great change in markets for tar products. Prices are all firm; and there is no evidence of likely reductions yet awhile. Pitch keeps strong; and a continuation of the advance is anticipated in well-informed quarters. Current sales are above normal output, and stocks are being drawn on. But how long they can last is difficult to prophesy. It is reported that South Wales have paid up to 120s. per ton. This may quite likely be correct, as the high prices being paid for export coal make it possible to obtain almost anything in the briquette trade, makers of which consequently pay the prices asked for pitch. It is again difficult to get a proper idea of quotations. Prepared tars are urgently wanted. Cresylic acid is a firm market, and dearer; while carbolic acid is, if anything, a trifle firmer. The home market for crystals is also improving slightly. Creosote is dearer, and there are few sellers at under 9½d. per gallon—probably 10d. is nearer the mark; and a further upward movement is looked for in many quarters. Benzol is in heavy demand, and there is no difficulty in selling all that can be made. Makers state that an additional 4d. per gallon could be secured. Production costs are heavier, and supplies are scarce, and it is feared will be insufficient to meet requirements of consumers during the spring and summer. Intermediate products are unchanged from last report.

Latest quotations are as follows:

Benzol: 90% London 2s. to 2s. 2d., North 1s. 11d. to 2s.; 50-90% 1s. 9d. to 2s. London, 1s. 10½d. North; crude 60-65%, 1s. 5d. to 1s. 7d.; pure, 3s. per gallon naked.

Crude Tar: London, 60s. to 65s.; Midlands, 53s. to 60s.; North, 57s. to 60s. per ton *ex* works. Refined tar, 40s. per barrel (free) on rail.

Pitch: London, 110s. per ton; East Coast, 102s. 6d. to 107s. 6d. per ton; West Coast, 100s. to 110s., with Manchester 102s. 6d. per ton, and Glasgow 105s. per ton; South Wales, 115s. per ton.

Solvent Naphtha: London, 3s. 6d. Provinces average 3s. 4d. per gallon.

Crude Naphtha: Naked, 10d.; North, 9d. per gallon.

Heavy Naphtha: 2s. 10d. per gallon.

Naphthalene: Refined, £23 per ton nominal; crude, £7 to £10 10s., according to quality.

Toluol: Naked, 2s. 9d. per gallon nominal. North, 2s. 7d. Pure, 3s.

Creosote: London, 9½d.; North, 8½d. to 9d.; heavy oil, 8d. per gallon in bulk.

Anthracene: 40-45%, 9d. per unit per cwt.

Grease Oils: 18° Tw. (naked), £6 10s. per ton f.o.r. makers' works.

Aniline Oil: 1s. 7d. to 1s. 8d. per lb., drums free.

Cresylic Acid: 95%, 3s. to 3s. 3d.; 97-99%, 3s. 3d. to 3s. 6d. per gallon *ex* works London, f.o.b. other ports.

Carbolic Acid: Crude 60%, 3s. 6d. per gallon; crystals 40%, 1s. 2d. to 1s. 3d. per lb.

Sulphate of Ammonia.

There is no fresh news in the home trade to report. Manufacturers think some readjustment of values is permissible in view of the continually increasing costs of production. The present price is much below the figure which would be reached in a free market, especially as nitrate of soda has been advanced to £24 10s. per ton. The demand for export is strong; but the material is not available to satisfy it at the moment. This trade, however, is growing at prices somewhere about £5 per ton above the fixed price for home sales. During January, the quantity and value of exports was: To France, 1468 tons (£34,136), compared with 1290 tons (£23,955) in 1919; Dutch East Indies, 6024 tons (£150,016); Japan, 2894 tons (£63,740); Spain, 216 tons (£6879); and to other places, 77 tons (£2047)—total, 10,679 tons, valued at £256,818, as compared with 3991 tons worth £116,013 in January, 1919.

Improved Coal Deliveries at Birmingham.—The coal shortage in Birmingham is still very troublesome; but as regards the effect on the Gas Department, the situation has improved. Good deliveries of coal are being made, though the quality is not up to the usual standard. The department are obliged to accept large consignments of slack and unscreened coal, instead of the screened gas coal which they have been accustomed to purchase. The department carbonize 20,000 tons a week; but the amount of coal received has amounted to about only 15,000 tons per week.

Winchester Gas Company and Seaborne Coal.

The support of the Winchester City Council in protesting against the substitution of seaborne coal by railborne coal has been asked by a deputation from the Winchester Water and Gas Company, comprising Mr. J. C. Warner (Chairman), Mr. W. H. Myers (Vice-Chairman), Colonel W. Barrow Simonds, and Mr. C. W. Oddie (Directors), and Mr. H. C. Head (Secretary and General Manager). It was pointed out that the step complained of has placed a great burden upon the gas consumers of the city; the price of seaborne coal amounting to 58s. 9d. per ton, as compared with railborne coal at 37s.—thus immediately increasing the cost of gas to the consumer by more than double the amount of the rebate which has been announced by the Board of Trade. Mr. Warner pointed out that prior to the war the price charged for gas was 3s. 6d. per 1000 c.ft.; while at the present time it was 5s., which was an increase of 43 p.ct. In Southampton, where they had seaborne coal, the price of gas had increased by 52 p.ct.; in Bournemouth, the increase had been 80 p.ct.; Newport (I.W.) 60 p.c.; Portsmouth, 100 p.ct.; and Chichester 107 p.ct. The gas companies in these towns were suffering from the same Order as Winchester, and would do so as long as they were compelled to take seaborne coal. At Basingstoke, the price of gas before the war was 3s. 6d., the same as at Winchester; and it was now 5s. But Basingstoke was receiving coal by rail, and not by sea. As a result of this increased cost of coal, the expenditure of the Winchester Gas Company had to December last gone up 66 p.ct. In addition to this, the increased wages they had been compelled to pay represented 142 p.ct.; and rates now demanded had increased by 50 p ct. There had, however, been no increase whatever in the rate of dividend paid by the Company, which for the past ten years had not been higher than 4¼ p.ct. After the deputation had withdrawn, the Council unanimously agreed to forward a request to the Coal Controller that the coal required for the manufacture of gas at Winchester should be railborne.

A Paper on Gas Manufacture.—The Junior Institution of Engineers, meeting at No. 39, Victoria Street, S.W., had quite a good evening on Friday, when Mr. F. E. Henman, of the Gas Light and Coke Company, read a paper on "Gas Manufacture," explanation of the technicalities of which was greatly assisted by a profuse display of lantern slides. The author began at the very commencement of his subject, and from the earliest days took his audience along to gas-works plant of to-day, describing as much of this as was possible within the compass of a paper of reasonable length. The matter was made more interesting by the informal manner in which it was presented. Mr. Henman was keenly questioned on many points arising during the reading of the paper; and when he sat down, there was further conversational discussion. Mr. T. Curr was in the chair.

Women Lamplighters and their Uniforms.—Sitting at the Lambeth County Court last Friday, Judge Parry heard a case in which Martha Turner claimed from the South Metropolitan Gas Company £6 10s. balance of wages. Plaintiff was one of a large number of women who entered the service of the Company as lamplighters during the war. At first her wages and bonus were 35s. a week; but later it was agreed that if the women did the same amount of work as the men they should be paid the same wages. The men received 44s. 6d. a week and found their own clothes; but the women had 42s. a week, with 2s. 6d. deducted for uniforms. The women understood that the deductions would be refunded when they handed in their uniforms. When Mrs. Turner left, she was offered 13s. Judge Parry said that if the women were to receive back the 2s. 6d. a week, it would place them in a much better position than the men. He gave judgment for the defendants.

Burnley Gas-Works Management.—The labour members of the Burnley Town Council, pursuing their policy of opposing all increases in the salaries of their chief officials, objected to the Gas Engineer (Mr. J. P. Leather) being given an advance of £180, bringing his salary to £800. An attack was made on Mr. Leather's management of the gas-works; and at one stage of the discussion, the Mayor (Alderman Hargreaves) was led to observe: "I would rather beg my bread from door to door than be an official of this Corporation." Mr. Hale objected to the increase—and he opened the attack—on business grounds, referring to the fact that last year there was a deficit of £15,000 on the gas-works. It was pointed out, however, that the Engineer was in no way responsible for this, for under the Act it was illegal to charge the consumer more than 3s. per 1000 c.ft., a price at which it was impossible to sell gas at a profit last year. Had Burnley been able to increase their charges as other towns had done, there would have been no loss to record. Mr. Grey said the recent report of the expert [Mr. W. Doig Gibb] was a complete vindication of the Burnley Gas Engineer, and a refutation of the attacks made upon him so consistently. A resolution to refer the increase back was defeated by 20 votes to 11.

Audley (Staffs) Gas-Works.—A special meeting of the Urban District Council has been held to consider the position of the gas-works. Mr. Latham, who presided, said it was felt the plant required some attention, to bring it up to date. Some of the members had thought that the general district rate was bearing a larger proportion of the expenses of the upkeep of the gas-works than it ought to do. The Gas Manager (Mr. John Mottram) informed the Council that the mains were upwards of 40 years old, and that the leakage of gas was approximately 25 p.ct. of the make. The Gas Secretary (Mr. A. Dean) submitted figures showing that the estimated cost of renewing the mains, providing a sulphate of ammonia plant, and two new station governors, &c., was £14,524. Mr. G. H. Burgess urged that the scheme must be gone on with, or the gas-works must be scrapped. They were going to have new houses, and they must be in a position to supply them with gas. The Chairman of the Gas Committee (Mr. G. Glover), speaking of the expenditure at the gas-works for the year, stated that the probable deficiency would be about £392, which was unsatisfactory. They should have a reserve fund and a working balance, or they would be badly handicapped in future. Eventually a Sub-Committee were appointed to go into the question of reconstruction of the works.

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Sir John Cass Technical Institute.

The prizes and certificates gained by students at the Sir John Cass Technical Insitute, Aldgate, were distributed by Lt.-Col. P. S. Lelean, C.B., C.M.G., Professor of Hygiene at the Royal Army Medical College, who gave an address on "Defensive Science in Gas Warfare," in which he described the preventive measures that had been adopted to meet its onset and evolution. After referring to the inital attack on April 23, 1915, when the civilized world was aroused to just anger by the news that the Germans had broken their pledged word in respect to the use of poisons as a means of injuring the enemy, he gave a full description of the great difficulties that were met with stage by stage during the development of protective appliances. In speaking of the helpful war work contributed by the staff of the Sir John Cass Technical Institute, Colonel Lelean expressed the view that it was to such Institutes that the nation looked in its hour of scientific need, and had not looked in vain, and that it is to such Institutes also that, with an ever-increasing appeal, we shall have to look for victory in the future strife of industrial competition, that can only be won by superior technical skill. In conclusion, he spoke of the blatant self-complacency with which the Germans had so long vaunted the supremacy of their scientists, that the world had begun to accept them at their own valuation. When, therefore, their equally over-rated army failed to win the anticipated easy victory by fair means, they summoned their alleged supermen, their scientists, to get to work as low down as possible, in the hope that the surprise of this blow below the belt would stagger us. What was the result? When once the first incredulous surprise was over, and we had mobilized our scientists to meet theirs, the end was never again in doubt Our scientists were able to defeat theirs at every turn and twist in the sordid conflict that they had forced upon us.

Possibilities of Gas.—Addressing the Blackburn Chamber of Commerce, Sir Lewis Board (the Town Clerk) said that of the present gas supply only 30 p.ct. went for lighting. There were great possibilities for gas. One of the points in erecting the new gas and electricity stations so close together was that if at any time they found it possible to fire their boilers with gas instead of coal, it would effect a tremendous saving in the residual products of coal, the value of which they have learned during the war.

Gas Apparatus Hire Charges.—The Glasgow Corporation Gas Sub-Committee have considered a report by the General Manager regarding the costs of materials, labour, &c., in connection with the installation of gas fires and radiators, and agreed to recommend (1) that the present charges for installing gas fires and radiators be increased by 50 p.ct.; (2) that rates of hire for new gas fires and radiators be increased by 50 p.ct. on the present rates; (3) that the present rentals for stand-by and check meters (chiefly used in public works) be increased by 100 p.ct.; and (4) that the present charge of 1s. 6d. for re-connecting and turning-on gas supply, after the supply has been cut off, be increased to 2s. 6d.

Summer Time in France.

In a message dated last Friday, the Paris correspondent of the "Daily Telegraph" said: Summer time begins in France to-morrow. At 11 o'clock, watches and clocks will be advanced to midnight. Generally, workmen in France are favourable to the reform, which is of great advantage to the country, having regard to the coal shortage. It is claimed that for 39,000,000 men there is a saving of light in the evening during seven months, while for 4,000,000 workers in industries little or no lighting is required through their having to rise an hour earlier in the morning. The saving in lighting is put at 60,000,000 frs. (£2,400,000). As to coal, there is a saving of 1 p.ct. for the Paris Gas Company; this representing 15,000 tons. In the Provinces the economy is from 4 to 37 p.ct. In electricity the economy is 3 p.ct. for Paris, or 2000 tons. The Ouest Lumière spends 40,000 frs. less, and the Marseille 50,000 frs. less. The percentage is lowest in Paris and Lyons, where the average economy is 1 ton per 1000 inhabitants a month. Generally, the economy is put at 15 p.ct. for electric lighting, and at 5 p.ct. for gas lighting. It has been computed that putting on the clock an hour is equivalent to the arrival of 1000 coal-trains, each carrying 500 tons, or of 1666 barges, each with 300 tons. It means that fifty millions of French gold is kept in the country.

Preston Gas Company.—Mr. John Leigh presided over the half-yearly meeting of the Preston Gas Company, when dividends for the half year were declared at the rate of 2½ p.ct. on the preference stock, 3⅜ p.ct. on the "A" stock, and 2⅜ p.ct. on the "B" stock.

Bristol Gas Company.—At the meeting to-day, a report will be submitted which states that, for the year ended Dec. 31, gas sales show an increase of 5·21 per cent.; and very satisfactory returns have been realized for residual products. Abnormal increases in the cost of coal, labour, and materials are again reported; and the price of gas was further advanced on Oct. 1, to meet the increased expenditure. The Directors regret to report the death of Mr. John Phillips, whose connection with the Company extended over a period of nearly sixty years. Sir Percy K. Stothert, K.B.E., has been elected to fill the vacancy on the Board. The Directors recommend that a dividend be declared for the half year at the rate of 5 p.ct. per annum.

Reconstruction Scheme at Accrington.—The Accrington and District Gas Board have decided to apply for sanction to borrow £133,000 for the reconstruction of part of the manufacturing plant at the Great Harwood gas-works, and the instalment of a system of vertical retorts of 2½ million c.ft. capacity, with coal elevating and conveying plant, grading plant, and complete railway connections. The sum is proposed to be raised as additional capital; and the annual charge, based on twenty years' borrowing, is put down at £11,970. Mr. A. J. Harrison (the General Manager) believes that by this expenditure the Board should secure a gross saving of £23,000 a year. He further says the cost of production in wages alone is now 11½d. per 1000 c.ft. of gas.

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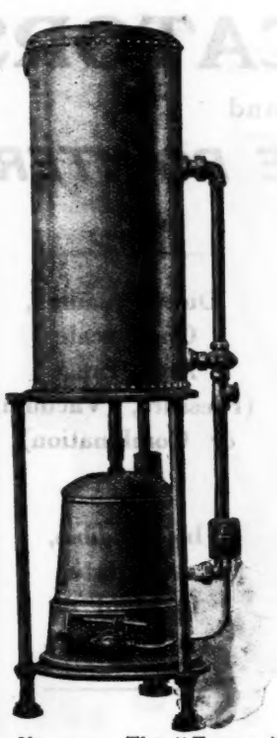

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Vertical Retorts for Beverley.—The Ministry of Health have sanctioned the application of the Beverley Town Council for power to borrow £26,700 for an installation of vertical retorts at the gas-works. The loan is to be repaid within twenty years.

City of Durham Gas Company.—At the annual meeting of the Company, the Chairman (Mr. G. Chapman, J.P.), moving the adoption of the report, said the expenditure had increased from £21,000 in 1918 to £27,000. The income had increased by £6600. A dividend of 5 p.ct. on the original and 3½ p.ct. on the additional capital for the half year was declared.

Amsterdam Municipal Gas-Works.—The report for the year 1918 states that the measures taken the previous year for the reduction of the gas consumption remained in full force, and were in some respects strengthened by an increase in the price of gas, which is now equivalent to 4s. 8d. per 1000 c.ft. for the first 25 cubic metres, and 7s. 6d. per 1000 c.ft. for every cubic metre above this initial quantity. The gas production during the year at the four works was 2,253,789,195 c.ft., of which 16·8 p.ct. was water gas. The reconstruction of No. 1 retort-house at the Western Gas-Works was completed, and the vertical retorts put into operation.

Watford Gas and Coke Company's Larger Business.—The report for the half year to Dec. 31 states that the sale of gas shows an increase of no less than 12 p.ct. over that of the corresponding half of 1918. Residuals also exhibit a most gratifying increase. On the other hand, the advance in the price of coal and oil, wages, and all materials and appliances, goes steadily on, with the result that the Directors were once more obliged to increase the price of gas. With the operation of the sliding-scale the last two increases in the price of gas mean a reduction of 1½ p.ct. in the dividend, a state of affairs which the Directors hope may soon be amended. The revenue account shows a profit of £3729, and the profit and loss account, after providing for interest on the mortgages, deposits, and loans, a balance of £2231. The Directors recommend the statutory dividends.

Cambridge Gas Company's Record Output.—It was stated by the Chairman (Mr. E. H Parker), at the half-yearly meeting of the Cambridge University and Town Gas Light Company, that the output of gas during the six months had been a record one, the make of gas having increased by no less than 42½ million c.ft. The receipts were more by £14,410, the expenditure by £12,711; so the Directors were able to recommend the usual dividends. With other large additional items of expense in front of them, however, it would probably be necessary to apply for power to increase the charge for gas beyond the present maximum of 4s. per 1000 c.ft. It was to the interest of all parties that the Company should be placed in a position to raise fresh capital, which could not be done until the maximum charge was increased. He offered to Mr. J. W. Auchterlonie (the Engineer), and the other officials, hearty thanks for the excellent services rendered by them. The Company owed a debt of gratitude to Mr. Auchterlonie for his able management of affairs in these extraordinary times.

Exeter Gas Light and Coke Company.—Dividends of 10 p.ct. per annum on the original stock and 7 p.ct. on the new ordinary shares (less income-tax) will be recommended at the annual meeting next Monday. The sales of gas last year amounted to over 32 million c.ft. more than in the preceding twelve months.

Street Lighting at Pontefract.—The street lighting of the borough of Pontefract, which has up to the present been under the control of the Surveyor's Department, has now been placed under the control of the Gas Engineer and Manager (Mr. D. J. Branson). Powers to obtain the necessary capital having been granted, it has been decided on Mr. Branson's recommendation to instal clockwork controllers on the lamps, and the contract has been placed with the Sutherland Meter Company, of Birmingham, for the necessary controllers and new lanterns.

Buckhaven Gas Arbitration.—Provost Taylor, at a meeting of the Buckhaven (Fife) Town Council, made a statement of the Gas Committee proceedings. He said that the Committee had negotiated for the purchase of the Wemyss Gas-Works, which supplied Buckhaven, and the Leven Gas-Works; but not until the Treasury embargo as to municipal loans was removed could they proceed. They had offered £15,498 for the Wemyss works, and £37,967 for the Leven works; but both were refused. They were ready to go on with the arbitration. The Companies were not quite prepared; but the Court had been appointed as follows: Oversman, Sheriff Wilson, K.C.; Arbitrator for Buckhaven Mr. H. Woodall, for Wemyss Mr. W. Doig Gibb, for Leven Mr. Alex. Yuill.

Largely Increased Sales at Croydon.—The report to be submitted at the meeting next Friday, states that, for the past half year, as compared with the corresponding period of 1918, the sale of gas showed an increase of 19·36 p.ct. In the half year the number of consumers increased by 540. The continued increase in wages and cost of materials, coupled with the increase in railway goods rates, makes it impossible to effect a reduction in the price of gas. A special allowance at the rate of 6d. per 1000 c.ft. will, however, be made off the accounts for gas used for domestic or household purposes during the present (Lady-day) quarter, as a consequence of the abatement of 10s. per ton on coal supplied for these purposes. The rate of this allowance (if the Order continues in operation) will be subject to revision, and may be altered so far as relates to the coming Midsummer quarter. During the half year, £24,550 of "D" stock has been issued, with the sanction of the Board of Trade, to consumers of gas and to persons in the employ of the Company, at the price of £80 per £100. This offer to consumers and employees is still open. The contractors have recommenced work upon the new gasholder; and some progress has been made with a system of high-pressure trunk mains designed to give an improved supply to certain outlying districts. After providing for all fixed charges, there remains available for division a balance of £19,715; and the Directors recommend that the statutory dividends be declared. These amount to £18,036, leaving a balance of £1679 to be carried to the next accounts.

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APPLICATIONS FOR PATENTS.

[Extracted from the "Official List" for Feb. 11.]

Nos. 3083–3841.

BARTLETT, A. J.—"Incandescent gas-burners." No. 3250.
BATEMAN, H. L.—"Upright gas-burners with mantles and supports." No. 3630.
BEATTIE, A.—"Lighting devices." No. 3660.
BENTON, A.—"Gas-stoves." No. 3302.
CLARKE, G.—"Screw-down cocks, taps, &c." No. 3554.
COMPAGNIE POUR LA FABRICATION DES COMPTEURS ET MATÉRIEL D'USINES À GAZ.—"Roots' blowers." No. 3341.
CORTHESY, J. H.—"Means for heating or superheating gases." No. 3111.
CUTLER-HAMMER MANUFACTURING CO.—"Determining calorific value of combustible fluids." No. 3503.
DODSON, E.—"Indicating flow of liquid." No. 3818.
ELLIOTT, J. E. F.—"Mantle support." No. 3271.
HANDS, F. E.—"Gas-cocks." No. 3623.
HUGHES, A.—"Incandescent waste-heat low-pressure heating apparatus." No. 3405.
INGRANIC ELECTRIC COMPANY.—See Cutler-Hammer. No. 3503.
JOHNSTONE, U. F.—See Hughes. No. 3405.
M'CREADIE, J.—See Benton. No. 3302.
NORTH, E.—"Obtaining power for heating." No. 3735.
PAGE, J. H.—"Geyser." No. 3225.
SMALLWOOD, A.—"Joints for pipes, conduits, &c." No. 3412.
STEPHENS, W. W.—See Hands. No. 3623.
TAYLOR, T.—"Device for heating and illuminating." No. 3626.
TULLY, C. B.—"Gas-producers." No. 3499.
TULLY, C. B.—"Manufacture of gas for heating and lighting." No. 3500.
WILLIAMS, H. A.—"Utilization of combustible gases for heating furnaces, &c." No. 3589.
WILTON, G.—"Manufacture of neutral dry ammonium sulphate." No 3308.

York Gas Company and Concrete Roadways.—At the York City Council Highways Committee, a letter was received from the Secretary of the York Gas Company in regard to the proposed reinforced concreting of roadways, calling attention to the extra cost which this would entail on the Company in repairing or renewing their mains under such roadways, and asking if the Corporation would pay the cost of moving the mains under the footpaths, or bear the extra cost incurred by the Company from time to time in repairs to their mains. The Committee decided that they could not entertain the Company's proposals.

Derby Gas Company's Centenary Year.—The Directors, reporting upon the accounts for the year ended Dec. 31, say that an interim dividend at the rate of 2½ p.ct. (less income-tax) for the June half year was paid; and they recommend a similar dividend for the December period. They much regret that a further reduction of the dividend by ½ p.ct. should occur in the centenary year, due to circumstances entirely beyond their control. There was an increase in the quantity of gas sold, especially during the December half year. The demand for gas appliances of all kinds indicates the continued popularity of gas—no doubt accentuated by the lowness of the price in the district supplied by the Company. The average price received for gas last year was just over 2s. 9d. per 1000 c.ft., which was one of the lowest in the country

It is stated that the Wycombe Gas Company are disposing of their undertaking to the Uxbridge Gas Company. The two towns are 14 miles apart.

The Directors of the Altrincham Gas Company announce that they will allow a rebate off the present price of gas for domestic purposes of 10d. per 1000 c.ft.

The Pontefract Corporation have approved an advance in salary to Mr. D. J. Branson, the Gas Engineer and Manager (who has free house, coal, and gas in addition), from £255 to £330 per annum.

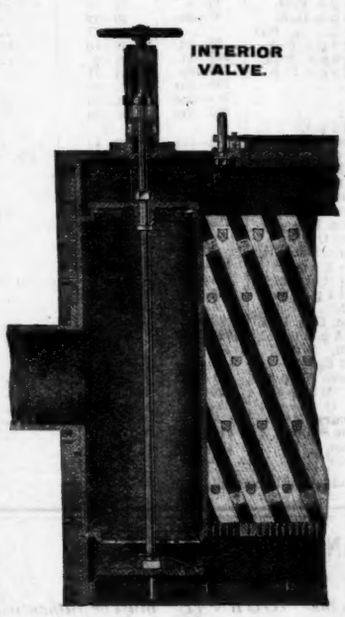
A fire occurred at the Padiham Gas-Works on the 11th inst. in one of the purifier-boxes; spontaneous combustion having arisen from the oxide. For safety, the fire brigade were summoned before the lid was removed.

At Ossett last week it was reported that the rebate to domestic gas consumers, in consequence of the reduction in the price of household coal, would amount to 9d. per 1000 c.ft., and that 77 p.ct. of the gas produced was affected.

At the Ideal Home Exhibition last Tuesday afternoon, when the band of the 1st Life Guards were engaged in connection with the opening of Parliament, their place was taken by the band of the South Metropolitan Gas Company.

The Mossley Gas Committee, in order to relieve the shortage of domestic fuel, have decided for the time being to reduce the price of coke to 1s. 6d. per cwt. at the gas-works. This price applies only to consumers in the Mossley area, and not to Saddleworth, which obtains its supply of gas from Mossley.

A man named George Davis appeared at the Edinburgh Sheriff Court last Tuesday, charged with thieving £54 18s. from prepayment gas-meters in Edinburgh and Leith. It was stated that the man had been employed temporarily by the Gas Commissioners; and after he had been discharged, he had continued to call upon consumers, and collect the money in the meters. He was sentenced to three months' imprisonment.



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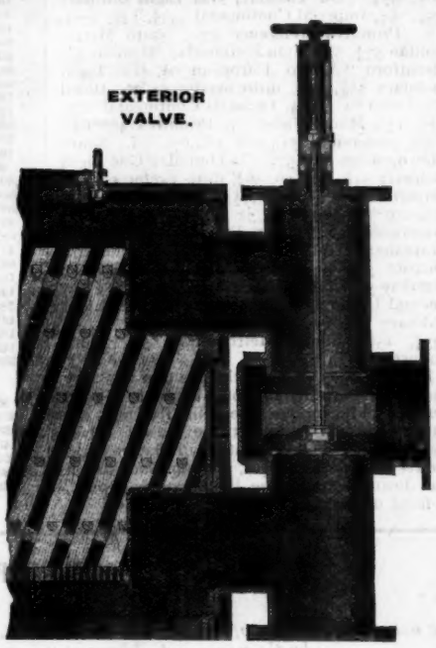

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STOCK MARKET REPORT.

THERE was no improvement to be noted in the general tendency of most markets on the Stock Exchange last week, for continued dulness was the prevailing characteristic throughout. Speculation was within close limits, and caution dictated the advisability of non-commitment. Better trade returns and Budget anticipations could not turn the scale the other way.

The gilt-edged market was still depressed, and Home Government issues were mostly a little lower; War Loan and Funding being the chief losers. Friday's figures were: Consols 49⅞-50¼, War Loan 90 1/16-90 5/16, Funding 72¼-72⅜, Victory 82⅛-83. Colonial issues and Indian were steady. Home Rails were much neglected and had no strength. Canadians suffered from Exchange; but Argentines were aided by good traffic.

The Foreign Market was dull almost to the close, when it improved slightly; French Loans being much steadier, and Brazilian and Chinese firm.

In the Miscellaneous Market there was less animation and enterprise; many new issues coming in competition. However, Rubber was in fair favour, and Nitrates and Textiles made a rally; but Oil had a set-back.

Business in the Gas Market was quiet, barely on a level with the previous week's moderate array of transactions. The movements in price were variable. The London Companies were steady. Gas Light and South Metropolitans were quoted *ex div.*, and lost nothing by the variation. In Suburban and Provincial, the most noticeable item was a further smart rise of 8 in Portsea "B." The Continentals were not strong. Union was quoted 3 lower, and Imperial had a slight fall of 1. Primitivas were unchanged. Several important companies held their annual meetings during the week—remarkable for the more than usually impressive and illuminating addresses of the chairmen, and for the satisfaction which these appeared to convey to the proprietors.

Bargains done for cash during the week were as follows: On Monday, Brentford "A" 50, Gas Light ordinary 55¼, 55½, 56, ditto debenture 50¾, Imperial Continenal 135, 135⅛, 136, 137, Metropolitan of Melbourne 90, Primitiva preference 65s., 63s. 9d., South Metropolitan 56⅛, 57½. On Tuesday, Gas Light ordinary 55¼, 56¼, Imperial Continental 133¼, 134, 135⅛, 136, Primitiva preference 65s., South Metropolitan 57¼, 57½. On Wednesday, Bombay 5⅛, Brentford "A" 50, European 9⅛, Gas Light ordinary 55⅜, 56⅜, ditto maximum 39, Ilford "A" and "C" 91½, Imperial Continental 134, 135, 136, Monte Video 74, Primitiva 32s. 6d., ditto preference 65s., 66s. 3d., 67s. 6d., South Metropolitan 56½, 57. On Thursday Gas Light ordinary 54½, 55½, 56, 56¼, ditto preference 59, Imperial Continental 134⅛, 135, 135⅛, ditto debenture 87, Primitiva 32s. 6d., 33s. 6d., ditto preference 65s., River Plate debenture 48½, Tottenham "B" 50, 52½, 52⅝, Southgate and District 5 p.ct. preference 78. On Friday, Bombay 5⅛, Commercial 4 p.ct. 56½, 58½, Continental Union 27, European 9¼, 9⅜, Gas Light ordinary 55½, 56¼, Imperial Continental 134, 135¼, 136, South Metropolitan 57, South Suburban 68¼.

In the Money Market, the position was very variable; sharp fluctuations between a good demand and complete ease being frequent, the latter condition ruling at the close. Silver moved wildly. On Wednesday it had reached the record figure of 89½d., and on Saturday it was down to 82d. The Bank rate is 6 p.ct., as fixed on Nov. 6, 1919.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S BARGAINS.

Issue. £	Shares	When ex-Dividend.	Ante-War Dividend & Bonus. p.c.	Last Dividend.	NAME.	Closing Prices, July 30, 1914.	Present Prices.	Lowest and Highest Prices of Bargains.
182,049	Stk	July 31	4	4%	Aldershot 4 p.c. Pref.	..	60—65	..
1,551,868	"	Sept. 26	2½	2⅞%	Alliance & Dublin Ord.	39—34	43—48	..
874,000	"	Jan. 15	4	4%	Do. 4 p.c. Deb.	76—79	61—63	..
266,000	5	Oct. 30	7½	8%	Bombay, Ltd.	5⅞—6⅜	5—5½	5½
50,000	10	Aug. 28	16	12%	Bournemouth Gas and Water { 10 p.c. B 7 p.c. Pref. 5 p.c. 4 p.c. Deb.	29—30	19—20	..
388,110	10	"	7	7%		15—15½	10—11	..
115,800	10	"	6	6/-		13½—14	9½—9⅝	..
159,740	—	Dec. 30	—	4%		..	64—66	..
999,045	Stk.	Feb. 12	16	30/-†	Brentford A Consolid.	261—266	48—53*	50
784,929	"	"	11	26/3†	Do. B New	204—209	43—48*	..
55,500	"	"	5	6%	Do. 5 p.c. Pref.	102—111	74—76*	..
221,480	"	Dec. 11	4	4%	Do. 4 p.c. Deb.	91—98	54—56	..
214,775	"	Sept. 11	11	7½%	Brighton & Hove Orig.	208—213	128—128	..
244,200	"	"	8	5½%	Do. A Ord. Stk.	154—159	84—85	..
1,287,500	Stk.	"	5	6%	Bristol 5 p.c. max.	..	..	..
680,000	20	Sept. 26	12½	10%	British	44—46	25—27	..
126,000	Stk.	Dec. 30	4	4%	Do. 4 p.c. Deb. Stk.	88—90	61—63	..
245,771	"	"	4	4%	Buenos Aires 4 p.c. Deb.	86—87	47—50	..
100,000	10	"	—	—	CapeTown & Dis., Ltd.	1½—2½	6½—7½	..
180,000	10	Oct. 30	—	4½%	Do. 4½ p.c. Pref.	4—6	6½—7	..
100,000	Stk.	Dec. 30	4½	4½%	Do. 4½ p.c. Deb. Stk.	70—75	53—63	..
167,150	"	Feb. 26	5	5%	Chester 5 p.c. Ord.	108—110	..	..
1,513,380	"	Aug 14	5/0/6	33/4	Commercial 4 p.c. Stk.	108—108	56—61	56½—58½
850,000	"	"	6½	26/8	Do. 5½ p.c. do.	103—105	51—56	..
475,000	"	Dec. 11	8	8%	Do. 5 p.c. Deb. Stk.	89½—71½	49—51	..
800,000	"	"	4	—	Continental Union Ltd.	26—29	27—33	27
200,000	"	"	7	—	Do. 7 p.c. Pref.	115—118	40—60	..
51,600	Stk.	Aug. 28	14½	10½% †	Croydon A 10 p.c.	..	135—145	..
276,400	—	"	11½	7½% †	Croydon B and C 7 p.c.	..	95—105	..
492,370	Stk.	"	6	5½%	Derby Con. Stk.	130—136	..	..
85,000	"	—	4	4%	Do. Deb. Stk.	102—104	..	..
1,009,180	10	Jan. 29	10	5/0	European, Ltd.	17½—18	9½—10½	9½ 9½
16,298,975	Stk.	Feb. 12	6/17/4	80/-		98—103	54—57*	54½—56½
2,500,000	"	"	3½	26/8	Gas Light and Coke { 4 p.c. Ord. 3½ p.c. max. 4 p.c. Con. Pref. 5 p.c. Con. Deb. 10 p.c. Bonds	78—79	33—43*	34
4,993,395	"	"	4	4%		96—99	60—63*	59
4,674,850	"	Dec. 11	8	8%		73½—74½	50—53	50½
180,000	"	"	10	10%		..	..	..
83,500	"	Sept. 11	5	4½%	Hastings & St. L. 5 p.c.	..	57—63	..
358,743	"	"	3½	2½%	Do. 5½ p.c	37—39	40—45	..
70,000	10	April 99	11	7½%	Hongkong & China, Ltd.	16½—16¾	8½—9½	..
66,606	Stk.	Aug. 28	9	8½%	Hornsey 7 p.c.	..	90—95	..
131,000	"	Sept. 11	9½	6⅝%	Ilford A and C.	131—134	88—93	91½
65,780	"	"	6½	4½%	Do. B	115—118	67—72	..
65,500	"	Dec. 30	4	4%	Do. 4 p.c. Deb.	92—94	59—43	..
4,940,000	"	May 14	9	4½%	Imperial Continental	136—139	134—139	138½—137
1,235,000	"	Feb. 12	9½	9½%	Do. 8½ p.c. Deb. Red.	84—85	85 10*	87
235,942	"	Sept. 11	8½	6½%	Lea Bridge Ord. 5 p.c.	119—121	86—91	..
2,498,925	"	Feb. 26	10	42/6	Liverpool 5 p.c. Ord. { A B	211—218 146—148	..	.. ..
306,088	"	June 26	4	4%	Do 4 p.c. Pr. Deb. Stk.	..	..	..
165,736	"	Aug. 14	7/5/6	8½%	Maidstone 5 p.c.	..	56—61	..
75,000	5	June 11	5	5%	Malta & Mediterranean	4½—4⅝	1½—2½	..
850,000	100	Oct. 1	4½	4½%	Met. of Melbourne { 4½ p.c. Deb. 7 p.c.	99—101	90—97	90
541,920	Stk.	Nov. 27	4	5%	Monte Video, Ltd.	11½—12	70—75	74
1,875,892	"	July 30	4½	5½%	Newcastle&Gatsh'd Con.	98½—99½	66—67	..
539,795	"	Dec. 30	5½	5½%	Do. 5½ p.c. Deb.	83—88	56—57	..
15,000	10	Sept. 11	—	11%	North Middlesex 10 p.c.	..	13½—13½	..
58,940	10	"	7/14/0	7%	" 7 p.c.	14—15	9—9½	..
900,000	Stk.	Nov. 27	8	8%	Oriental, Ltd.	117—122	102—105	..
80,000	5	Mar. 26	10	1/-	Ottoman, Ltd.	7½—7¾	4½—5½	..
60,000	50	Aug. 28	15	7½%	Portsea, Island B	128—131	68 73	..
100,000	50	"	12	6½%	Do. C	118—121	65—70	..
249,980	5	April 29	8	—	Primitiva Ord.	5½—6	1⅜ 2	3 1/16—3 3/16
499,960	5	June 26	5	—	Do. 5 p.c. Pref.	4½—5	8½ 3½	65/—63 9
521,800	100	Dec. 1	4	4%	Do. 4 p.c. Deb.	91—98	70—72	..
600,000	Stk.	Jan. 29	4	4%	Do. " " 1911	..	48—51	..
846,198	"	Dec. 30	4	4%	River Plate 4 p.c. Deb.	85—87	47—50	48½
150,000	10	Sept. 26	6	6/-	San Paulo { 6 p.c. Pref. 5 p.c. Deb.	10½—11	7⅛—8	..
125,000	50	Dec. 30	5	5%		47—49	39—41	..
185,000	Stk.	Aug. 28	10	5%	Sheffield A	228—234	75—80	..
209,984	"	"	10	6%	Do. B	222—224	75—80	..
528,500	"	"	10	4½%	Do. C	220—222	75—80	..
133,201	Stk.	Sept. 12	4	4%	Shrewsbury 5 p.c.	..	..	..
95,000	10	Oct. 15	9	10%	South African.	10½—11½	12—18	..
6,609,895	Stk.	Feb. 12	5/4/0	80/-	South Met. 4 p.c. Ord.	111—118	54—57*	56½—57½
250,000	"	Jan. 15	—	5%	Do. Pref.	..	93—95	..
1,895,445	"	"	8	8%	Do. 3 p.c. Deb.	72½—74½	50 52	..
294,820	"	Aug. 14	6½	5%	South Shields Con. Stk.	157—159	105—107	..
1,087,795	"	"	6	8½%	S'th Suburb'n Ord. 5 p.c.	114—116	68—73	68½
247,558	Stk.	Dec. 30	5	5%	Do. 5 p.c. Deb. Stk.	116—118	78—83	..
647,740	"	Nov. 13	7½	8½%	Southampton Ord.	99—102	61—63	..
131,275	"	Dec. 30	4	4%	Do. 4 p.c. Deb. Stk.	..	61—63	..
120,000	"	Aug. 14		8½%†	Tottenham { A 5 p.c. B 3½ p.c. 4 p.c. Deb.	135—138	70—75	..
725,275	"	"	6	2½%†		115—117	50—55	50—52¾
181,355	"	Dec. 11	4	4%		57—60	53—65	..
183,330	10	Dec. 30	5	—	Tuscan, Ltd.	5—6	1—2	..
149,900	10	July 1	5	5%	Do. 5 p.c. Deb. Red.	93—95	45—50	..
286,478	Stk.	Sept. 26	5	3½%	Tynemouth 5 p.c. max.	103½—100	74—76	..
80,000	"	Aug. 28	8⅜	55/-	Wandsworth, Wimbledon, and Epsom— Wandsworth A 5 p.c.	151—156	85—90	..
255,688	"	"	6½	40/-	Do. B 3½ p.c.	129—134	63—68	..
108,075	"	"	—	38/6	Do. C	..	63—68	..
140,865	"	"	—	38/6	New Ordinary	..	63—68	..
352,000	"	"	6⅛	38/9	Wimbledon 5 p.c.	117—122	65—70	..
98,000	"	"	6⅜	40/-	Epsom 5 p.c.	121—126	65—70	..
88,416	"	Dec. 30	3	3%	3 p.c. Deb. Stk.	56—60	48—50	..

* Ex Div. † Next dividend will be at this rate.

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